AS PER NEW PATTERN 2024-2025

PREPARATORY EXAMINATION JANUARY-2025

COLLECTION OF DIFFERENT DISTRICT QUESTION PAPERS

PUC II YEAR

CHEMISTRY

IN THIS STUDY MATERIALS

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- All District Preparatory Question Papers
- 3 Set of Model Question Papers
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BASAVAJYOTI SCIENCE AND COMMERCE P U COLLEGE
JAMKHANDI - 587301 DISTRICT : BAGALKOTE

SUPER COLLECTION OF QUESTION PAPERS FOR

POCKET MARKS 70/70

KABBUR PUBLICATIONS SAVADATTI, CONTACT : 9738237960

Collection Of Question Papers For POCKET MARKS 70/70

PUC II YEAR PREPARATORY EXAMINATION-2025

AS PER NEW PATTERN 2024-2025

SUPER COLLECTION OF QUESTION PAPERS FOR

POCKET MARKS 70/70



PUC II YEAR

CHEMISTRY

BASAVAJYOTI
SCIENCE AND COMMERCE
P U COLLEGE JAMKHANDI-587301

COLLECTION OF
DIFFERENT DISTRICT

PREPARATORY EXAMINATION
JANUARY-2025

QUESTION PAPERS

By :

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- ಅರ್ಪಣೆ -

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CHEMISTRY
SUPER COLLECTION OF QUESTION PAPERS FOR
POCKET MARKS 70/70

KABBUR PUBLICATIONS SAVADATTI 9738237960

Collection Of Question Papers For POCKET MARKS 70/70

II PUC Preparatory Examination - Jan. - 2025

Time : 3.00 hours | **Sub : CHEMISTRY (34)** | Marks : 70

INSTRUCTIONS :-

i) The question paper has FIVE parts All the FIVE parts are compulsory

ii) Write the balanced chemical equestions and draw diagrams where ever necessary

iii) Use log table and simple calculator if necessary.

DISTRICT : BAGALKOTE

PART - A

I. Select the correct option from the given choices, each carries 1 mark **1 X 15 = 15**

1) In a solution containing non-volatile solute, the mole fraction of solvent is 0.9
The relative lowering of vapour pressure is
a) 1 b) 0.1c) 0.9d) 1.1

2) A galvanic cell has electricalpotential of 1.1 V.If an opposing potential of 1.1V is applied to this cell, what will happen to the cell reaction and current flowing through the cell?
a) The reaction stops and no current flows through the cell.
b) The reaction continuous but current flows in opposite direction.
c) The concentration of reactants becomes unity and current flows from cathode to anode.
d) The cell does not function as a galvanic cell and zinc is deposited on zinc plate

3) All natural and artificial radioactive decay of unstable nuclei take place by
a) Zero order kinetics b)half order kinetics
b) first order kinetics d)second order kinetics

4) Order of a reaction in which unit of rate of reaction and rate constant are same
a) 0 b) 1 c) ½ d) 2

5) Identify the correct sequence of number of unpaired electrons of the following ions.
a) $Ti^{+3} > Cr^{3+} > Fe^{3+} > Ni^{2+}$ b) $Fe^{3+} > Ni^{2+} > Ti^{+3} > Cr^{3+}$
c) $Fe^{3+} > Cr^{3+} > Ni^{2+} > Ti^{+3}$ d) $Fe^{3+} > Cr^{3+} > Ti^{+3} > Ni^{2+}$

6) An ambidentate ligand is
a) Cl^- b) CN^- c) OH^- d) NO_2^+

7) 1, 2 - dichloro ethane Is an example of
a) Alklene di halides b) alkyl di ene halides
c) Vinyl di halides d) geminal –di halides.

8) StatementI : Enantiomers are non-superimposable mirror Images on each other.
StatementII : A racemic mixture shows zero optical rotation.
Identifythecorrect statement
a) Both statement I and II are correct
b) Both statement I and II are incorrect
c) Statement I is correct and statement II is incorrect.
d) Statement I is incorrect and statement II is correct.

9) The products formed when phenol is treated with excess of bromine water is/are
(i) o-bromophenol (ii) p-bromo phenol (iii) picric acid (iv) 2,4,6-tribromo phenol
a) only (iii) b) only (iv) c) both (i)and(ii) d) only (ii)

10) The chemicals used to convert commercial alcohol into denatured alcohol are
a) CuSO4 and Pyrolidine b) Cu2S and Pyrolidine
c)$CuSO_4$ and Pyridine d) Cu2S and Pyridine.

11) As the size of the aldehyde molecule increases,the odour becomes
a) More pungent b)more fragrant c) less fragrant d)no change in the odour.

12) The reagent useful for separation and purification of aldehydes is
a) silver nitrate solution b) sodium hydrogen sulphite
c) Fehling's solution d) sodium sulphate.

13) The correct order of basic strength in case of ethyl substituted amines in aqueous solutionis
a) $(C_2H_5)_2NH > (C_2H_5)_3N > C_2H_5NH_2 > NH_3$ c) $(C_2H_5)_3N > (C_2H_5)_2NH > C_2H_5NH_2 > NH_3$
b) $(C_2H_5)_3N > C_2H_5NH_2 > (C_2H_5)_2NH > NH_3$ d) $NH_3 > (C_2H_5)_2NH > (C_2H_5)_3N > C_2H_5NH_2$

14) p-Amino azo benzene is prepared from benzene diazonium chloride and aniline in
a) Acidic medium b) basic medium c) neutral medium d) both acidic and basic medium

15) The transition metal present in red pigment of blood haemoglobin is
a) cobalt b) nickel c) Iron d) copper

II. Fill in the Blanks ,each carries 1 mark **1 X 5 = 5**

(Yb^{2+}, cobalt , Instantaneous, glycogen, methanol)

16) Storage polysaccharide present in animals is _____

17) The chemical name of wood spirit is _____

18) Vitamin B12 Is a coordination compound of _____-metal

19) The diamagnetic lanthanoidion is _____

20) The rate at a particular moment of time is expressed as _____ rate of reaction

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PART - B

III Answer any THREE of the following questions, each carries 2 mark **2 X 3 = 6**

21) Write any two differences between ideal and non-ideal solutions.
22) What are interstitial compounds? Give an example.
23) Explain Fittig's reaction
24) Write the reactions involved in preparation of phenol from cumene.
25) What are hormones? Name a hormone that mediate responses to external stimuli.

PART - C

IV Answer any THREE of the following questions , each carries 3 mark **3 X 3 = 9**

26) Using valence bond theory explain geometry hybridization and magnetic property of [Co(NH3)6]3-(Given atomic number of Co is 27)
27) Mention any three postulates of Werner's theory of co-ordination
28) Give any three applications of coordination compounds.
29) What is lanthanoid contraction? Name two elements of actinoids which exhibits +7 oxidation state in their compounds.
30) When a chromite ore 'A' is fused with sodium carbonate in free excess of air and the product is dissolved in water, a yellow solution of compound 'B' is obtained. After treatment of this yellow solution with sulphuric acid compound 'C' can be crystallize from the solution. When compound 'C' is treated with KCl orange crystals of compound 'D'Is crystallizes out. Write all the reactionsinvolved intheconversion of 'A'to 'D'.

V. Answer any TWO of the following questions , each carries 3 mark **3 X 2 = 6**

31) Derive integrated rate equation for a first order reaction.
32) State Faraday's II law of electrolysis. Mention any two factors which determines the product of electrolysis.
33) Direct measurement of conductivity of ionic solutions by Wheatstone bridge is not possible. Give reasons. Suggest a remedy to resolve it.
34) Write three reasons to justify that osmotic pressure method has the advantage over other colligative methods for the measurement of molar mass of proteins and polymers.

PART - D

VI. Answer any FOUR of the following questions, each carries 5 mark **5X4=20**

35) a) Write any three differences between SN1 and SN2 reaction mechanisms.
    b) Explain Saytzeff rule with an example.
36) a) Give the mechanism involved in the acid catalyzed hydration of C_2H_4 to C_2H_5OH
    b) Name the enzyme involved in fermentation of glucose into ethanol and write its chemical equation.
37) a) Give the IUPAC name of i) CH_3CHO ii) $CH_2 = CH - CHO$ iii) $CH_3COOCH_2CH_3$
    b) Explin Gatterman Koch reaction
38) a) .Write equations for i) The reaction between carboxylic acid and PCl_5
    ii) The reaction between formaldehyde and conc. KOH.
    iii) The formation of oxime from carbonyl compound.
    b) Among formic acid and acetic acid which is more acidic? Give reason
39) a) Give the preparation of p-hydroxyazobenzene.
    b) pKb of aniline is more than that of methanamine. Give reasons
    c) Name any one biologically active amino compound to increase blood pressure
40) a) Write the Haworth structure of Sucrose
    b) List out the Vitamin deficiency diseases and main sources of vitamin A, C, & B12

PART - E

VII Answer any THREE of the following questions, each carries 3 mark **3 X 3 = 9**

41) Calculate the molality of 20% (w/v) aqueous solution of KI. Given density of aqueous solution of KI = 1.2gcm–3. Molar mass of KI = 166 g mol-1
42) Vapour pressure of water at 293K is 17.535 mm Hg. Calculate the vapour pressure of water at 293K when 25 g of glucose is dissolved in 450 g of water.
43) Two electrolytic cells A and B containing solutions of AgNO3 and CuSO4 respectively are connected in series. A steady current of 1.5 amperes was passed through them until 1.45 g of silver is deposited at the cathode of cell
    A. How long did the current flow and what mass of copper was deposited?
    [Atomic mass of copper = 63.5 and silver = 108].
44) The electrical resistance of a column of 0.05 mol L–1NaOH solution of diameter 1 cm and length 50 cm is 5.55 × 103 ohm. Calculate its resistivity, conductivity and molar conductivity.
45) The rate of a reaction quadruples when the temperature changes from 293 K to 313 K. Calculate the energy of activation of the reaction assuming that it does not change with temperature.
46) In the given reaction A→B, the rate constant k is 2.0 x 10–2 lit mol-1s -1, find initial rate of reaction when [A]= 0.5 M at 298K.

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DISTRICT LEVEL II PUC PREPARATORY EXAM, JANUARY – 2025

Time: 3 Hours **Sub: CHEMISTRY (34)** **Max. Marks: 70**

General Instructions:

1. The question paper has five parts having 46. All parts are compulsory.
2. (a) Part – A carries 20 marks, each question carries 1 mark.
   (b) Part – B carries 06 marks, each question carries 2 marks.
   (c) Part – C carries 15 marks, each question carries 3 marks.
   (d) Part – D carries 20 marks, each question carries 5 marks.
   (e) Part – E carries 09 marks, each question (probem) carries 3 marks.
3. In Part – A question, first attempted answer will be considered for awarding marks.
4. Write balanced chemical equations and draw diagrams wherever necessary.
5. Direct answers to the numerical problems without detailed steps and specific unit for final answer will not carry any marks
6. Use log table and simple calculators if necessary. (Use of scientific calculator is not allowed).

DISTRICT : BALLARI - VIJAYANAGAR

PART – A

I. **Select the correct option from the given choices:** **15 × 1 = 15**

1. Which of the following is dependent on temperature?
   (A) Molarity (B) Mole fraction
   (C) Weight percentage (D) Molality

2. For 0.1M solution, the colligative property will follow the order
   (A) $NaCl > Na_2SO_4 > Na_3PO_4$ (B) $NaCl < Na_2SO_4 < Na_3PO_4$
   (C) $NaCl < Na_2SO_4 \approx Na_3PO_4$ (D) $NaCl < Na_2SO_4 = Na_3PO_4$

3. For a zero order reaction, the intercept for the plot of concentration of reactants Vs time is equal to
   (A) $-k$ (B) $\log k$ (C) $[R_0]$ (D) $\log [R_0]$

4. **Statement 1**: Fe^{+3} ions show paramagnetic and magnetic moment of $5.92BM$
   Statement 2: Fe^{+3} ions have d^3 electronic configuration.
   Identify the correct statement.
   (A) Statement 1 is incorrect and Statement 2 is correct
   (B) Both Statements 1 and 2 are incorrect
   (C) Both Statement 1 and 2 are correct
   (D) Statement 1 is incorrect and Statement 2 is incorrect

5. The primary and secondary valencies of $\left[Fe(C_2O_4)_3\right]^{3-}$ complexes are
   (A) 3 and 3 (B) 3 and 6 (C) 6 and 3 (D) 0 and 3

6. **Statement 1**: The crystal field theory (CFT) is an electrostatic model which considers the metal–ligand bond to be ionic.
   Statement 2: The crystal field theory (CFT) considers ligands as point dipoles incase of neutral molecules.
   Identify the correct statement.
   (A) Both Statement 1 and 2 are correct
   (B) Both Statements 1 and 2 are incorrect
   (C) Statement 1 is incorrect and Statement 2 is incorrect
   (D) Statement 1 is incorrect and Statement 2 is correct

7. The best reagent used to produce pure alkyl halides from alcohol is
   (A) Concentrated HCl (B) Concentrated HBr (C) $SOCl_2$ (D) $NaBr$

24. Identify the major product formed in the following reaction. Write its IUPAC name.

$$CH_3 - CH = CH_2 \xrightarrow{H_2O\ /\ H^+} ?$$

25. Write the Haworth structure of Sucrose.

PART – C

IV. **Answer any THREE of the following. Each question carries THREE marks:** **3 × 3 = 9**

26. Write the balanced chemical equations for the reactions involved in preparation of potassium dichromate from Chromite ore. [3M]

27. (a) Write any two differences between Lanthanoids and Actinoids? [2M]
(b) What is the composition of Mischmetal? [1M]

28. On the basis of Valence Bond Theory (VBT) explain the hybridization, geometrical shape and magnetic property of $\left[Ni(CN)_4\right]^{2-}$ complex. [3M]

29. Write any three postulates of Werner's theory of complexes. [3M]

30. (a) Write the structures of geometrical isomers of $\left[Co(NH_3)_3(NO_2)_3\right]$. [2M]
(b) Write the IUPAC name of $\left[Co(NH_3)_3(H_2O)_3\right]Cl_3$ [1M]

V. **Answer any TWO of the following. Each question carries THREE marks:** **2 × 3 = 6**

31. Give any three differences between solutions showing positive and negative deviation from ideal behaviour.

32. Describe the construction and working of SHE or Standard Hydrogen Electrode.

33. Write a neat diagram of $H_2 - O_2$ Fuel cell and express its cathodic and anodic reactions.

34. Derive the integrated rate equation for first order reaction.

PART – D

VI. **Answer any FOUR of the following. Each question carries FIVE marks:** **4 × 5 =20**

35. (a) Write the steps involved in mechanism of conversion of 2-bromo-2-methyl butane into 2-methyl-butan-2-ol. Which type of solvent favors such reaction? [3M]
(b) Define the following: (i) Racemic mixtures (ii) Enantiomers. [2M]

36. (a) Write the mechanism of acid catalysed dehydration of ethanol to ethene. [3M]
(b) Explain Kolbe's reaction with an example. [2M]

37. (a) Explain the preparation of carboxylic acids from Grignard reagent. Give equation. [3M]
(b) Explain HVZ (Hell – Volhard – Zelinsky) reaction with example. [2M]

38. (a) Write the general equation involved in addition of ammonia and its derivatives to carbonyl group. [2M]
(b) Explain Cannizzaro's reaction with an example. [2M]
(c) Among methanoic acid and ethanoic acid, which is more acidic? [1M]

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8. Select the incorrect match.
   (A) Swartz reaction - CoF_2 (B) Finkelstein reaction - NaI
   (C) Sandmeyers reaction - $CuCl_2$ (D) Wurtz reaction - Na / *dry ether*

9. Identify the simple ether from the following
   (A) $CH_3OC_2H_5$ (B) $C_2H_5OC_6H_5$ (C) $C_6H_5OC_6H_5$ (D) $C_6H_5OCH_3$

10. Which of the following compound can convert phenol to benzene?
   (A) CrO_3 (B) Zinc dust (C) Pyridine (D) Strong acid

11. Which of the following carbonyl compounds can be prepared from Rosenmund reaction?
   (A) Methanal (B) Acetone (C) Butanone (D) Benzaldehyde

12. A compound on treatment with hydrazine followed by heating upto 473K with KOH in ethylene glycol gives propane. Identify the compound.
   (A) Methanal (B) Ethanal (C) Propanal (D) Acetone

13. Which of the following is a 2^0 amine?
   (A) $CH_3CH_2NHCH_3$ (B) $(CH_3)_3N$
   (C) $(CH_3CH_2CH_2)_2NCH_3$ (D) $C_6H_5NH_2$

14. Which of the following is a non – reducing sugar?
   (A) Galactose (B) Glucose (C) Fructose (D) Sucrose

15. Which of the following amino acids are aromatic in nature?
   (A) Methionine (B) Isoleucine (C) Proline (D) Histidine

II. **Fill in the blanks choosing the appropriate word from those given in the brackets:** **5 × 1 = 5**

(Chromium, sp^2, sp^3, Hoffmann, Galvanisation, Reverse osmosis)

16. Desalination of water is based on _____.
17. Protection of iron by coating with zinc is called _____.
18. Element with more unpaired electron in 3d series is _____.
19. In Allylic alcohols – OH group is attached to a _____ hybridized carbon adjacent to the carbon-carbon double bond.
20. _____ developed a method for preparation of primary amines by treating an amide with bromine in aqueous or ethanolic solution of sodium hydroxide.

PART – B

III. **Answer any <u>THREE</u> of the following questions. Each question carries <u>TWO</u> marks:** **3 × 2 = 6**

21. According to the collision theory give any two criteria for effective collision.
22. Why is Cr^{2+} reducing and Mn^{3+} oxidizing when both have d^4 configuration.
23. Complete the following reactions:
   (a) $C_6H_5MgBr + C_2H_5ONa \rightarrow$
   (b) $CH_3Br + KNO_2 \rightarrow$

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39. (a) Write the general equation involved in Gabriel phthalimide synthesis for preparation of primary amine. [2M]
(b) Explain Carbyl amine reaction with equation. [2M]
(c) Arrange the following compounds in the increasing of their basicity. [1M]
$CH_3NH_2, C_6H_5NH_2, NH_3$

40. (a) Write the products of oxidation of glucose with: (i) Bromine water (ii) Nitric acid [2M]
(b) What are fat soluble vitamins? Give an example. [2M]
(c) Name the Nitrogenous base present only in RNA but not in DNA. [1M]

PART – E
(NUMERICAL PROBLEMS)

VII. **Answer any THREE of the following. Each question carries THREE marks:** $3 \times 3 = 9$

41. Calculate the osmotic pressure in Pascal's exerted by a solution prepared by dissolving 1.0g of polymer of molar mass 185,000 g/mol in 450 ml of water at 37°C.

42. The boiling point of Benzene is $353.23K$. When $1.80g$ of non-volatile solute was dissolved in $90gram$ of benzene, the boiling point is raised to $354.11K$. Calculate the molar mass of the solute. K_b for benzene is $2.53 K Kg / mol$

43. For the standard cell $Cu_{(s)} / Cu^{2+}_{(aq)} \| Ag^{+}_{(aq)} / Ag_{(s)}$.

$E^0_{Cu^{2+}/Cu} = +0.34V \quad E^0_{Ag^+/Ag} = +0.80\,V.$

(i) Identify the cathode and the anode as the current is drawn from the cell.
(ii) Write the reaction taking place at the electrodes.
(iii) Calculate the standard cell potential.

44. The cell in which of the following reaction occurs: $2Fe^{3+}_{(aq)} + 2I^-_{(aq)} \rightarrow 2Fe^{2+}_{(aq)} + I_{2(s)}$ has $E^0_{cell} = 0.236V$ at $298K$. Calculate the standard Gibbs energy change and the equilibrium constant of the cell reaction.

45. The rate constants of a reaction at $500K$ and $700K$ are $0.02s^{-1}$ and $0.07s^{-1}$ respectively. Calculate the values of E_a. Given that $(R = 8.314\ J.\ K^{-1}.mol^{-1})$

46. Half life period of a first order reaction is 30 minutes. Calculate the time required to complete 80% of the reaction.

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SECOND PUC PREPARATORY EXAM JANUARY - 2025

Code : 34 Subject : CHEMISTRY Duration : 3 Hrs.

Date : Max. Marks : 70

Instructions : i) The question paper has five parts: All parts are compulsory.

DISTRICT : BELAGAVI

ii) Part A carries 20 marks, each question carries 1 marks.
Part B carries 06 marks, each question carries 2 marks
Part C carries 15 marks, each question carries 3 marks
Part D carries 20 marks, each question carries 5 marks
Part E carries 09 marks, each question carries 3 marks

iii) In Part-A questions, first attempted answer will be considered for awarding marks.

iv) Write balanced chemical equations and draw neat labelled diagrams & graphs wherever necessary.

v) Direct answers to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.

vi) Use log tables and simple calculator if necessary. (Use of scientific calculators is not allowed)

PART - A

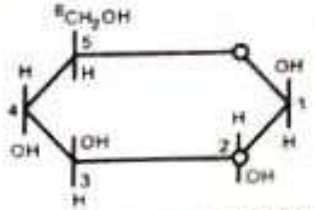
I. Select the correct option from the given choices. **1 x 15 = 15**

1) Which of the following statements regarding primary and secondary valencies is correct ?
   a) Primary Valencies are ionisable while secondary Valencies are non-ionisable.
   b) Primary Valencies are non-ionisable while secondary Valencies are ionisable.
   c) Both Primary and secondary Valencies are non-ionisable.
   d) Both Primary and secondary Valencies are ionisable.

2) The mixture which shows positive deviation from Raoult's law is,
   a) ethanol + acetone b) benzene + toluene
   c) acetone + chloroform d) chlorobenzene + bromoethane

3) 1, 2 - dichloroethane is an example of,
   a) alkylene dihalides b) alkylidene halides
   c) vinyl dihalides d) gem-dihalides.

4) Identify the compound from the Haworth's projection shown.



   a) α–D-glucopyranose b) β–D-(–)-glucofuranose
   c) α–D-(–)-glucofuranose d) β–D-(+)-glucopyranose

5) **Statement I** : Tertiary alcohols heated with copper at 573 is yields 2-methyl propene.
   Statement II : Tertiary alcohols undergo dehydration when heated with Cu/573K
   Identify the correct statement.
   a) Both statement I and II are correct
   b) Both statement I and II are incorrect
   c) Statement I is correct and statement II is in correct.
   d) Statement I is incorrect and statement II is correct.

(P.T.O.)

6) Which type of complexes doesn't shows geometrical isomericim
   a) $[MX_2L_2]$ Tetrahedral b) [MABXL] square planar.
   c) $[MX_2L_2]$ square planner d) $[MX_4L_2]$ octahedral.
7) Which of these statements about galvanic cell are not ture ?
   i) the cathode carries a positive sign.
   ii) The anions migrate toward the cathode
   iii) the electrons are released through the anode.
   iv) reduction occurs at the anode
   a) i and iii b) i and ii c) ii and iii d) ii and iv
8) Which of the following is used in the preservation of biological specimens ?
   a) Methanol b) Ethanol c) Benzaldehyde d) Acetone
9) Which of the following base is not present in DNA ?
   a) Adenine b) Guanine c) Thymine d) Uracil
10) Sulphur containing amino acid is
   a) Cysteine b) tyrasine c) Histidine d) proline
11) Which of the following is correct for a zero order reaction ?
   a) $t_{1/2} \alpha [R]_o^0$ b) $t_{1/2} \alpha [R]_o^2$ c) $t_{1/2} \alpha [R]_o^{-1}$ d) $t_{1/2} \alpha [R]_o^1$
12) A compound on treatment with hydrazine followed by heating up to 473K with KOH in ethylene glycol gives propane. Identify the compound.
   a) Acetone b) Ethanal c) Propanal d) Methanal
13) Identify the correct sequence of number of unpaired electrons of the following ions.
   a) $Ti^{+3} > Cr^{+3} > Fe^{+3} > Ni^{+2}$
   b) $Fe^{+3} > Ni^{+2} > Ti^{+2} > Cr^{+3}$
   c) $Fe^{+3} > Cr^{+3} > Ni^{+2} > Ti^{+3}$
   d) $Fe^{+3} > Cr^{+3} > Ti^{+3} > Ni^{+2}$
14) Which of the following reagents cannot be used to convert nitrobenzene to aniline ?
   a) $LiAlH_4$ - dry ether b) Sn/Hcl c) H_2/Pd - ethanol d) Fe in HCl
15) What is the correct order of boiling points of alcohols having the same number of Carbon atoms ?
   a) $1^o > 2^o > 3^o$ b) $3^o > 2^o > 1^o$ c) $3^o > 1^o > 2^o$ d) $2^o > 1^o > 3^o$

II. Fill in the blanks by choosing the appropriate word from those given in the brackets : **5 x 1 = 5**

(order, insoluble, secondary cell, soluble, HNO_2, Methanol)

16) Primary aliphatic amines convert into aliphatic alcohols on reacting with _____ solution.
17) Amylose is water _____ component of starch.
18) _____is also known as wood spirit.
19) The _____ of a reaction is an experimental quantity.
20) Lead storage battery is a _____.

PART - B

III. Answer any THREE of the following. 3 x 2 = 6

21) Draw a graph to show the effect of temperature on rate of a reaction.

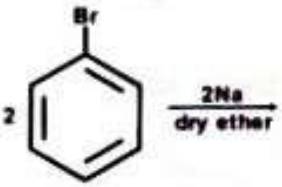
22) Explain the preparation of Anisole by Williamson's ether synthesis.

23) What are chelate ligands ? Give an example.

24) What are essential amino acids ? Is Glycine an essential or non-essential anino acid ?

25) Complete the following reaction.

i) $CH_3Br + KNO_2 \longrightarrow$ ii)



PART - C

IV. Answer any THREE of the following. 3 x 3 = 9

26) Write the balanced chemical reaction for the following.
   a) Reaction between potassium permanganate and iodide ion in acidic medium.
   b) Reaction between potassium permanganate and iodide ion in neutral medium.
   c) Reaction between potassium permanganate and oxalate ion in acidic medium.

27) Using, VBT, explain hybridisation, magnetic property and shape of $[Ni(CN)_4]^{-2}$ complex.

28) What is lanthanoid contraction ? Name two elements of actionoids which exhibits +7 oxidation. State in their compounds.

29) a) Draw energy level diagram of crystal field splitting in octahedral complex.
   b) Name the metal present in haemoglobin.

30) a) Transition metals and their compounds are good catalyst. Give two reasons.
   b) Write the composition of Brass alloy.

V. Answer any TWO of the following questions. 2 x 3 = 6

31) Write the anodic and cathodic reaction during working of Leclanche cell. What is the role of produced ammonia during cell reaction ?

32) Derive an integrated rate equation for first order reaction.

33) a) What is reverse osmosis ? Mention one of its application.
   b) Define molarity.

34) a) Plot a graph of molar conductivity V/s $\sqrt{C}$ for strong and weak electrolytes in solution.
   b) For strong electrolytes, write the equation that represent the variation of molar conductivity with dilution.

PART – D

VI. Answer any FOUR of the following questions. 4 x 5 = 20

35) a) Name any two main forces which stabilize the secondary and tertiary structures of proteins.
   b) Name the harmone which regulates the glucose level in blood.

36) a) Write the mechanism of dehydration of ethanol to ethene in acid medium.
   b) Which among the following compounds have lowest and highest pka value ? p-nitrophenol, phenol, ethanol and o-cresol.

(P.T.O.)

37) a) Write the steps involved in mechanism of conversion of 2-chloro-2-methyl butane into 2-methyl-butan-2-ol. Which type of solvent favours such reaction ?

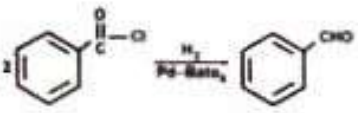
b) Complete the following reaction sequence :

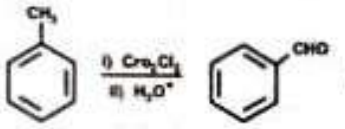
$$C_6H_6 + Br_2 \xrightarrow{FeBr_3} X \xrightarrow{Mg/dry\ ether} Y$$

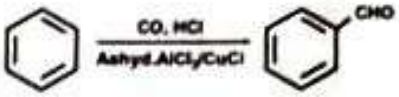
38) a) Explain Hoffmann bromamide degradation reaction by taking butanamide as an example. Give the IUPAC name of the product. [3]

b) pK_b value of aniline is more than that of methanamine. Give reasons. [2]

39) a) Write the name of the following reactions.

i) 

ii) 

iii) 

b) How is benzamide obtained from benzoic acid ? Write the reaction.

40) a) Between methanal and ethanal, which would undergo aldol condensation ? Write the chemical reaction involved in it.

b) Explain HVZ (Hell-Volhard-Zelinsky) reaction with equation.

PART – E

(Numerical Problems)

VII. Answer any THREE of the following questions. **3 x 3 = 9**

41) The resistance of a 0.01N solution of an electrolyte is 100 Ohms. Calculate its,

a) Conductance b) Conductivity c) resistivity.

(The cell constant of the cell is 1cm.)

42) The rate of a reaction quadruples when the temparature changes from 293K to 313K. Calculate the energy of activation of the reaction assuming that it does not change the temperature.

43) The boiling point of benzene is 353.23K. When 1.80g of a non-volabile solute was dissolved in 90g of benzene the boiling point is raised to 354.11 k. Calculate the molar mass of the solute K_b for benzene is 2.53 k.kg mol^{-1}.

44) A solution of $Ni(No_3)_2$ is electrolysed between platinum electrodes using a current at 5 amperes for 20 minutes. What mass of Ni is deposited at the cathode ?

45) 75% of the first order reaction is completed in 30 minutes. Calculate rate constant of the reaction.

46) Vapour pressure of water at 293k is 17.535mm of Hg. Calculate the vapour pressure of water at 293k, when 25g of glucose is dissolved in 450g of water.

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Collection Of Question Papers For POCKET MARKS 70/70

Sub: CHEMISTRY (34)

Total no. of questions : 46

Time: 3 Hrs

Total Marks: 70

DISTRICT : BENGALURU AS

Instructions:

(i) The question paper has Five parts. All the parts are compulsory.

(ii) (a) Part – A carries 20 marks. Each question carries one mark.
(b) Part – B carries 6 marks. Each question carries two marks.
(c) Part – C carries 15 marks. Each question carries three marks.
(d) Part – D carries 20 marks. Each question carries five marks.
(e) Part – E carries 9 marks. Each question carries three marks.

(iii) In part – A questions, first attempted answer will be considered for awarding marks.

(iv) Write balanced chemical equations and draw neat labeled diagrams and graphs wherever necessary.

(v) Direct answer to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.

(vi) Use log tables and simple calculator if necessary. (use of scientific calculator is not allowed)

(vii) For a question having circuit / figure / graph / diagram, alternate questions are given at the end of question paper in a separate section for visually challenged students.

PART – A

I. Select the correct option from the given choices. $15 \times 1 = 15$

1. A liquid was mixed with methanol and heated with a con. H_2SO_4 as a catalyst and dehydrating agent, A compound with a fruity smell was formed. The liquid was
   (a) CH_3CHO (b) CH_3COCH_3 (c) CH_3COOH (d) CH_3CH_2OH

2. The bad odour substance formed by the action of alcoholic caustic potash on chloroform and aniline is
   (a) nitrobenzene (b) phenyl isocyanide
   (c) phenyl cyanide (d) phenyl isocyanate

3. Glycosidic linkage is on
   (a) amide linkage (b) ester linkage
   (c) ether linkage (d) acetyl linkage

4. Wilkinson catalyst is a
   (a) Platinum complex (b) Silver complex
   (c) Rhodium complex (d) Cyanide complex

5. Freon can be prepred by
   (a) Finkelstein reaction (b) Wurtz reaction
   (c) Friedal Crafts reaction (d) Swart'z reaction

6. Actinoids are
   (a) Radio active (b) Prepared in namograms
   (c) Having smaller half-lives (d) all the above are correct

7. Which of the following compound will have the smallest pKa value?
   (a) Formic acid (b) Benzoic acid (c) [illegible] (d) Phenyl acetic acid

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Collection Of Question Papers For POCKET MARKS 70/70

8. The rate of reaction $A \rightarrow B$ increases two times by increasing the concentration of reactant A four times, the order of reaction is

(a) $\frac{1}{2}$ (b) 1 (c) 2 (d) 0

9. Assertion : The specific conductivity decreases with dilution.

Reason: The number of dissolved ions per unit volume increases on dilution.

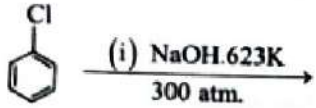
(a) Both assertion and reason are true and the reason is the correct explanation of the assertion.

(b) Both assertion and reason are true. But the reason is not the correct explanation of the assertion.

(c) Assertion is true, but the reason is false.

(d) Both assertion and reason are false.

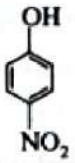
10. Find out the product of the following reaction.



(a) 

(b) 

(c) 

(d) 

11. De-salination of sea water can be done by

(a) Dialysis (b) Hypertonic solution

(c) Evaporation (d) Reverse osmosis

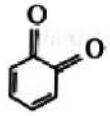
12. The K_H values for $Ar_{(g)}$, $CO_{2(g)}$, $HCHO_{(g)}$ and $CH_{4(g)}$ are 40.39, 1.67, 1.83×10^{-5} and 0.413 respectively arranged in the order of their increasing solubility.

(a) $HCHO < CH_4 < CO_2 < Ar$ (b) $HCHO < CO_2 < CH_4 < Ar$

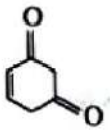
(c) $Ar < CO_2 < CH_4 < HCHO$ (d) $Ar < CH_4 < CO_2 < HCHO$

13. Phenol on oxidation with chromic acid gives

(a) 

(b) 

(c) 

(d) 

14. Match the following

	List – I		List – II
A	Optically inactive amino acid	i.	Glycine
B	Sulphur containing amino acid	ii.	Cysteine
C	Aromatic amino acid	iii.	Tyrosine
D	Heterocyclic ring amino acid	iv.	Proline
		v.	Alanine

(a) A - i, B - ii, C - iii, D - iv (b) A - ii, B - i, C - iii, D - iv

(c) A - iv, B - iii, C - i, D - ii (d) A - iii, B - ii, C - i, D – v

15. The crystal field splitting energy in octahedral complex (Δ_0) greater than pairing energy (P), then the Ligand forms

(a) Low spin complex (b) High spin complex

(c) Medium spin complex (d) None of the above

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II. Fill in the blanks by choosing the appropriate answers from those given in the brackets: $5 \times 1 = 5$

(Osmium, benzenesulphonyl chloride, dettol, aldehyde, edema, anoxia)

16. _____ has highest oxidation stae in 5d-series.
17. _____ is the chemical name of Hinsberg's reagent.
18. The mixture of chloroxylenol and terpineol is called _____.
19. People taking lot of salt or salty food suffers from the disease called _____.
20. Ozonolysis of alkenes followed by reaction with zinc dust and water gives _____.

PART – B

III. Answer any THREE of the following. Each question carries TWO marks. $3 \times 2 = 6$

21. State 'Saytzeff's rule' with an example.
22. Write the reactions to show that glucose contains (a) six carbon atoms in a straight chain.
    (b) Five – hydroxyl groups.
23. By taking formation of hydrogen iodide, explain Arrhenius theory of activated complex by using potential energy level diagram.
24. Convert the following reactions.

    (a) $CH_3-\underset{\underset{OH}{|}}{CH}-CH_3 \xrightarrow[573K]{Cu}$ (b) $C_6H_5OH \xrightarrow[\Delta]{Zn\ dust}$

25. Name the Oxometal anions of the first series of the transition metal in which the metal exhibits the oxidation state equal to it's group number.

PART – C

IV. Answer any THREE of the following. Each question carries THREE marks. $3 \times 3 = 9$

26. How is potassium dichromate prepared from chromite ore with balanced equations.
27. On the basis of valence bond theory, explain the hybridization, geometrical shape and magnetic property of $\left[Ni(CN)_4\right]^{2-}$.
28. What is lanthanoid contraction and give any two consequences of it?
29. What is meant by stability of a co-ordination compound in solution? State the factors which governs stability of complexes.
30. (a) Draw the geometrical isomers of $\left[Fe(NH_3)_2(CN)_4\right]^-$.

    (b) What is 'density' in co-ordination compounds?

V. Answer any TWO of the following. Each question carries THREE marks. $2 \times 3 = 6$

31. Explain the determination of standard reduction potential value for zinc electrode by using standard hydrogen electrode as a reference electrode.
32. Derive integrated rate equation for the first order reaction.
33. Explain "The Rusting of iron is an electrochemical phenomenon".
34. Give reason for the following:

    (a) Scuba drivers fill their air cylinders with dilute Helium.

    (b) Addition of small amount of salt in water decreases it's freezing point.

    (c) The i value for aqueous KCl is more than ethanol in benzene.

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VI. Answer any FOUR of the following. Each question carries FIVE marks. $4 \times 5 = 20$

35. (a) An aromatic compound 'A' on treatment with aqueous ammonia and heating forms a compound 'B' which on heating with Br_2 and KOH forms a compound 'C' of molecular formula C_6H_7N. Write the structure and IUPAC name of compounds A, B and C.

    (b) Give reason:

    (i) During reduction of nitrocompounds to amines, scrap iron and hydrochloric acid are preferred.

    (ii) Solubility of aliphatic primary amines decreases with increase in molar mass of amines.

36. (a) With respect to structure of carbonyl group. Give the following (i) Hybridisation of carbonyl carbon atom (ii) σ and π - bonds around it. (iii) Geometry and bond angle.

    (b) Explain the conversion of toluene to benzaldehyde by side chain chlorination.

37. (a) Write the Haworth's structure of Maltose.

    (b) Name the types of bases present in Nucleic acids.

    (c) Write the Zwitter ion structure for Glycine.

38. (a) Explain the mechanism involved in the conversion of tertiary butyl bromide into tertiary butyl alcohol.

    (b) Explain "Butane 2-ol is a chiral molecule and optically active".

39. (a) Write chemical reactions to affect the following transformations.

    (i) Butan-1-ol to butanoic acid.

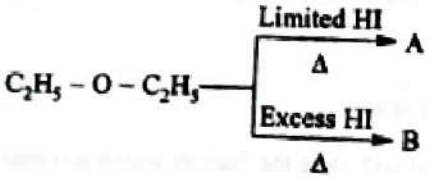
    (ii) Cyclohexene to hexane – 1, 6-dioic acid.

    (iii) Butanal to butanoic acid.

    (b) Explain Clemmenson reduction with an example.

40. (a) Write the mechanism of dehydration of ethanol to ethene.

    (b) Identify the products of the following reaction.



PART – E (Numerical Problems)

VII. Answer any THREE of the following. Each question carries THREE marks. $3 \times 3 = 9$

41. Time required to decompose SO_2Cl_2 to half of it's initial amount is 60 minutes. If the decomposition is a first order reaction. Calculate the rate constant of the reaction.

42. Henry's law constant for CO_2 in water is 1.67×10^8 pascals at 298 K. Calculate the quantity of CO_2 in 500 ml of soda water when packed under 2.5 atm CO_2 at 298 K.

43. The conductivity of 0.20 M solution of KCl at 298 K is 0.0248 S cm^{-1}. Calculate it's molar conductivity.

44. A solution containing 18 gm of non-volatile non-electrolyte solute is dissolved in 200 gm of water freezes at 272.07 K. Calculate the molecular mass of solute. (Given $K_f = 1.86$ K kg / mol and freezing point of water is 273 K].

5. The standard electrode potential for Daniel cell is 1.1 V. Calculate the standard Gibb's energy for the reaction.

$$Zn_{(s)} + Cu^{+2}_{(aq)} \longrightarrow Zn^{2+}_{(aq)} + Cu_{(s)}$$

. The rate of a reaction increases by four times, when the temperature of the reaction is raised from 340 K to 360 K. Calculate the energy of activation of the reaction. [Given R = 8.314 J/K /mol].

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Collection Of Question Papers For POCKET MARKS 70/70

BB **SECOND PUC PREPARATORY EXAMINATION JANUARY - 2025**

Sub: CHEMISTRY (34)

Time: 3 Hrs **Total no. of questions : 46**

Total Marks: 70

DISTRICT : BENGALURU BB

Instructions:

(i) The question paper has Five parts. All the parts are compulsory.

(ii) (a) Part – A carries 20 marks. Each question carries one mark.
(b) Part – B carries 6 marks. Each question carries two marks.
(c) Part – C carries 15 marks. Each question carries three marks.
(d) Part – D carries 20 marks. Each question carries five marks.
(e) Part – E carries 9 marks. Each question carries three marks.

(iii) In part – A questions, first attempted answer will be considered for awarding marks.

(iv) Write balanced chemical equations and draw neat labeled diagrams and graphs wherever necessary.

(v) Direct answer to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.

(vi) Use log tables and simple calculator if necessary. (use of scientific calculator is not allowed)

(vii) For a question having circuit / figure / graph / diagram, alternate questions are given at the end of question paper in a separate section for visually challenged students.

PART – A

I. Select the correct option from the given choices. **$15 \times 1 = 15$**

1. Value of Henry's constant K_H
   (a) increases with increase in temperature
   (b) decreases with increase in temperature
   (c) remains constant
   (d) first increases then decreases

2. Saturated solution of KNO_3 is used to make salt bridge because.
   (a) Velocity of K is greater than that of NO_3^-
   (b) Velocity of NO_3^- is greater than that of K^+
   (c) Velocity of both K^+ and NO_3^- are nearly the same
   (d) KNO_3 is highly soluble in water

3. The overall order of a reaction which has the rate expression $\text{Rate} = K[A]^{\frac{1}{2}}[B]^{\frac{3}{2}}$
   (a) $\frac{1}{2}$ (b) 2 (c) $\frac{3}{2}$ (d) 3

4. The solutions which show a large positive deviation from Raoult's law form
   (a) Minimum boiling point azeotrope
   (b) Maximum boiling point azeotrope
   (c) Minimum or maximum boiling point azeotrope
   (d) No azeotrope

5. The common oxidation state of Lanthanoids is
   (a) +2 (b) +4 (c) +1 (d) +3

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6. Square planar complex of the type MABXL (where A, B, X, L are unidentates) shows three isomers. Among them

(a) Two cis and one trans (b) One cis and two trans

(c) All three are cis only (d) All three are trans only

7. The oxidation state of metal in metal carbonyl complexes is

(a) 1 (b) 2 (c) 3 (d) 0

8. The chemical name of phosgene is

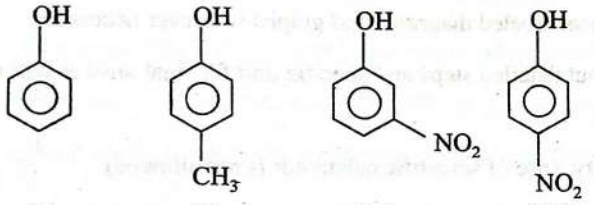
(a) Acetyl chloride (b) Methyl chloride

(c) Carbonyl chloride (d) Chloroform

9. When secondary alcohol is heated with Cu at 573 K, it forms

(a) Aldehyde (b) Ketone (c) Carboxylic acid (d) Alkene

10. In the following compounds



(I) (II) (III) (IV)

The order of acidity is

(a) III > IV > I > II (b) I > IV > III > II

(c) II > I > III > IV (d) IV > III > I > II

11. Oxidising agent used in Etards reaction is

(a) H_2 – Pd (b) CrO_3 (c) CrO_2Cl_2 (d) $KMnO_4$

12. A compound does not react with 2, 4-dinitro phenyl hydrazine, the compound is

(a) acetone (b) acetaldehyde (c) methanol (d) none of these

13. IUPAC name of $(CH_3)_3N$ is

(a) N, N dimethyl methanamine (b) N-methyl amine

(c) Methanamine (d) N-ethyl amine

14. The basic character of methyl amines in aqueous phase is

(a) 3° > 2° > 1° > NH_3 (b) 2° > 3° > 1° > NH_3

(c) 1° > 2° > 3° > NH_3 (d) none of these

15. The water soluble vitamin is

(a) vitamin D (b) vitamin A (c) vitamin E (d) vitamin C

II. Fill in the blanks by choosing the appropriate word from those given in the brackets: 5 × 1 = 5

(glycine, o-nitrophenol, CO_2, enantiomers, camphor, phenol)

16. _____ in nitrogen gas is the example for gaseous solution.

17. Acidified $KMnO_4$ oxidises oxalate ion to _____.

18. The process of conversion of _____ into Racenaic mixture is known as racemisation.

19. _____ is steam volatile due to intramolecular hydrogen bonding.

20. Optically inactive amino acid is _____.

37. (a) Explain the preparation of carboxylic acid from Grignard reagent. Write equation.

(b) Complete the following reactions.

(i)  $+CH_3COCl \xrightarrow[AlCl_3]{\text{anhydrous}}$ _____

(ii) $\begin{matrix} H_3C \\ \\ H_3C \end{matrix}\!\!>\!C=O + NH_2OH \longrightarrow$

(c) Among 4-nitrobenzoic acid and 4-methoxy benzoic acid, which is more acidic? (2 + 2 + 1)

38. (a) Explain the mechanism of acid catalysed dehydration of ethanol to ethane.

(b) How is phenol manufactured by Cumene process? (3 + 2)

39. (a) Write the equations for the steps in S_N1 mechanism of hydrolysis of 2-bromo 2-methyl propane.

(b) Identify A, B and C in the following equation.

$$CH_3OH \xrightarrow[Cl_2]{\text{Red P}} A \xrightarrow[\text{dryacetone}]{NaI} B \xrightarrow[\text{Na and dry ether}]{C_6H_5I} C$$

40. (a) Explain Hoffmann's bromamide degradation reaction for the preparation of aniline.

(b) Name the product formed when nitrous acid is treated with methylamine. Give reaction.

(c) Aromatic primary amines cannot be prepared by Gabriel phthalimide synthesis. Give reason.

(2 + 2 + 1)

PART – E (Numerical Problems)

VII. Answer any THREE of the following. Each question carries THREE marks. $3 \times 3 = 9$

41. 60% of a first order reaction was completed in 60 minutes. Calculate the time required to complete 50% of the same reaction.

42. A solution of $Ni(NO_3)_2$ is electrolysed between platinum electrodes using a current of 5 amperes for 20 minutes. What mass of Ni is deposited at the cathode? (Atomic mass of Ni = 58.69 U).

43. Calculate the equilibrium constant for the reaction : $Fe^{2+}(aq) + Ag^{+}(aq) \longrightarrow Fe^{3+}(aq) + Ag(s)$

Given $E^0_{Fe^{3+}/Fe^{2+}} = 0.77V$ and $E^0_{Ag^{+}/Ag} = 0.80V$

44. Calculate the mass of ascorbic acid ($C_6H_8O_6$) to be dissolved in 75g of acetic acid to lower its melting point by 1.5°C ($K_f = 3.9$ K kg mol^{-1})

45. The rate constant of a reaction at 25°C is $3.5 \times 10^{-3}\ s^{-1}$. Calculate the rate constant at 35°C. [Given $E_a = 52.3$ kJ and $R = 8.314\ J\ K^{-1}\ mol^{-1}$]

46. Vapour pressure of water at 293 K is 17.535 mm Hg. Calculate the vapour pressure of solution at the same temperature, when 25 g of glucose ($C_6H_{12}O_6$) is dissolved in 450 g of water.

* * * * *

PART – B

III. Answer any THREE of the following. Each question carries TWO marks. $3 \times 2 = 6$

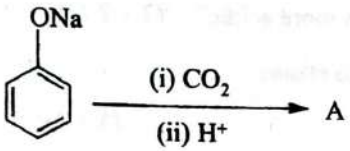
21. What are the two factors for the effective collisions between the molecules in a chemical reaction?

22. Calculate the spin only magnetic moment of Ti^{3+} ion (Atomic number of Ti = 22).

23. Explain Saytzeff rule with an example.

24. Identify A and B in the following equations.

(i)



(ii) $(CH_3)_3C-O-C_2H_5 \xrightarrow{HI} C_2H_5OH + B$

25. What is denaturation of proteins? Which level of structure remains intact during of globular proteins?

PART – C

IV. Answer any THREE of the following. Each question carries THREE marks. $3 \times 3 = 9$

26. How is potassium permanganate prepared from MnO_2? Write the equations.

27. (a) Study of actinoids elements is more difficult. Give two reasons.

(b) What is mischmetal? (2 + 1)

28. (a) Give the facial (fac) and meridional (mer) isomeric structures of $[Co(NH_3)_3(NO_2)_3]$.

(b) Give an example for heteroleptic complexes. (2 + 1)

29. Using VBT explain the geometry, hybridization and magnetic property of $[Co(NH_3)_6]^{3+}$ ion.

30. (a) Write any two postulates of Werner theory of co-ordination compounds.

(b) Give the IUPAC of $K_3[Cr(C_2O_4)_3]$ (2 + 1)

V. Answer any TWO of the following. Each question carries THREE marks. $2 \times 3 = 6$

31. Derive an integrated rate equation for the rate constant of first order reaction.

32. (a) Write the cathodic and anodic cell reactions of $H_2 - O_2$ fuel cell.

(b) Why does the conductivity of a solution decreases with dilution? (2 + 1)

33. (a) State Faraday's II law of electrolysis.

(b) How many Faraday of electricity is required to reduce MnO_4^- to Mn^{+2}.

(c) Give an example for inert electrode.

34. (a) What is Reverse Osmosis? Mention its one practical utility. (1 + 1+ 1)

(b) Solubility of gas in liquid decreases with increase in temperature. Give reason. (2 + 1)

PART - D

VI. Answer any FOUR of the following. Each question carries FIVE marks. $4 \times 5 = 20$

35. (a) Write the Haworth structure of Maltose.

(b) Give any two differences between RNA and DNA.

(c) Name the harmone which regulates blood sugar level in the body. (2 + 2 + 1)

36. (a) How is benzoyl chloride converted into benzaldehyde? Name the reaction.

(b) Explain aldol condensation reaction for acetaldehyde. Write the equation.

(c) Identify 'A' in the reaction $>C=O \xrightarrow{Zn-Hg} A + H_2O$ (2 + 2 + 1)

Collection Of Question Papers For POCKET MARKS 70/70

II PUC PREPARATORY EXAMINATION, JANUARY-2025

SUBJECT : CHEMISTRY (34)

Time : 3 Hours **Max Marks : 70**

DISTRICT : BENGALURU N

PART-A

I Select the correct option from the given choices. **15x1=15**

1) The concentration term which is a function of temperature is
a) Molality b) Molarity c) Molefraction c) Mass percentage

2) Statement I : A catalyst does not alter Gibbs energy ΔG of a reaciton
Statement II : A catalyst catalyses the spontaneous reactions only
a) Both Statement I and II are correct
b) Both statement I and II are incorrect
c) Statement I is correct but Statement II is incorrect
d) Statement I is incorrect but Statement II is correct

3) For a chemical reaction $A \rightarrow B$, it is found that the rate of a reaction doubles when the concentration of A is doubled. The order of the reaction is
a) One b) Two c) Zero d) Three

4) The quantity of electricity required for the reduction of one mole of Al^{3+} ions is
a) 1 Faraday b) 2 Faraday c) 3 Faraday d) 4 Faraday

5) The aqueous solution of a transition metal ion M^{x+} is colourless the ion M^{x+} is
a) Mn^{2+} b) Cr^{3+} c) V^{4+} d) Ti^{4+}

6) The transition metal present in bronze is
a) Zinc b) Tin c) Silver d) Copper

7) The electron configuration of an octahedral 'd^4' coordination entity with $\Delta_0 > P$ is
a) $t_{2g}^3 e_g^1$ b) $t_{2g}^2 e_g^2$ c) $t_{2g}^4 e_g^0$ d) $t_{2g}^1 e_g^3$

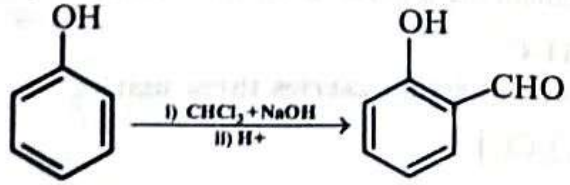
8) Enantiomers only differ with respect to
a) Melting point b) Boiling point
c) refractive index d) the rotation of plane polarised light

9) A Ketone on reduction with sodiumborohydride ($NaBH_4$) gives
a) Primary alcohol b) Hydrocarbon c) Seconday alcohol d) Tertiary alcohol

10) Ammonical silver nitrate solution is called as
a) Schiff's reagent b) Tollen's reagent c) Lucas reagent d) Fehling's reagent

11) The amine which cannot be prepared by Gabriel phthalimide synthesis is
a) Ethanamine b) Aniline c) Methanamine d) Propanamine

12) The given reaction is known as



a) Kolbe's reaction b) Reimer-Tiemann reaction
c) Williamson synthesis d) Wurtz-fittig reaction

13) The IUPAC name of $CH_3 - NH - CH_2 - CH_3$ is
a) Ethyl methylamine b) N-Ethylmethanamine
c) N,N-Methylethamine d) N-Methylethanamine

(P.T.O.)

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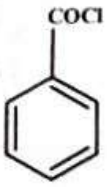
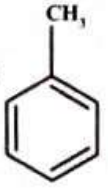
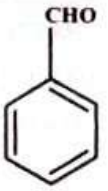
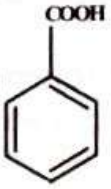
14) If the product formed from the following reaction is A, then A is 

a) 

b) 

c) 

d) 

15) Match the items of List I and List II

List I	List II
A) Thymine	i) Pentose sugar present in RNA
B) Uracil	ii) Nitrogen base present only in DNA
C) β – D – 2 – deoxyribose	iii) Nitrogen base present only in RNA
D) β – D – ribose	iv) Pentose sugar present in DNA

a) A-i, B-iii, C-iv, D-ii b) A-ii, B-iii, C-iv, D-i

c) A-ii, B-iii, C-i, D-iv d) A-ii, B-iv, C-i, D-iii

II Fill in the blanks by choosing the appropriate word from those given in the brackets: **5x1=5**

(decreases, EDTA, Ketohexose, aldohexose, increases, phosgene)

16) Fructose is an important _____.

17) The boiling points of alcohols and phenols _____ with increase in number of carbon atoms.

18) _____ is an example for polydentate ligand.

19) Chloroform on oxidation with air in presence of light forms _____.

20) As activation energy _____ rate of reaction increases.

PART-B

III Answer any THREE of the following. Each question carries two marks. **3x2=6**

21) What is reverse osmosis ? Give one important application of it.

22) What is lanthanoid contraction ? Mention the cause for it.

23) Aryl halides are less reactive towards nucleophilic substitution reactions. Give two reasons.

24) What happens when phenol is heated with Zinc dust ? Give equation.

25) Name the two hormones which together regulate the glucose level in the blood.

PART-C

IV Answer any THREE of the following. Each question carries three marks. **3x3=9**

26) a) Draw Cis and Trans isomers of $[Pt(NH_3)_2Cl_2]$.

b) Write the IUPAC name of $[Cu(NH_3)_4]SO_4$. **(2+1)**

27) a) Mention any two postulates of Werner's theory of coordination compounds.

b) Give an example for ambidentate ligand. **(2+1)**

28) Using valence bond theory, explain geometry, hybridization and magnetic property of $[CoF_6]^{3-}$ [Atomic number of cobalt is 27].

(P.T.O.)

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29) a) Calculate the spin only magnetic moment of Fe^{2+} ion. [Atomic number of iron is 26]
b) Which is a stronger reducing agent Cr^{2+} or Fe^{2+} ? **(2+1)**

30) Write the chemical equations for the preparation of potassium dichromate from chromtie ore.

V Answer any TWO of the following. Each question carries three marks. **2x3=6**

31) Derive integrated rate equation for the rate constant of a zero-order reaction.

32) Give any three differences between ideal and non-ideal solutions.

33) Name the fuel cell used in Apollospace programme and write its anodic and cathodic reactions.

34) a) Name any two methods to prevent corrosion.
b) State Faraday's First law of electrolysis. **(2+1)**

PART-D

VI Answer any FOUR of the following. Each question carries Five marks. **4x5=20**

35) a) Write the Haworth structure of Lactose.
b) Name the disease caused by the deficiency of Vitamin C.
c) What are globular proteins ? Given an example. **(2+1+2)**

36) a) Explain Hoffmann's bromamide reaction with an example.
b) How does aniline react with bromine water ? Give equation.
c) What is Hinsberg reagent ? **(2+2+1)**

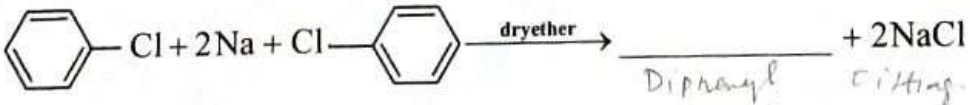
37) a) Explain Cannizzaro reaction taking benzaldehyde as an example.
b) How does ethanal reacts with hydroxyl amine ? Give equation.
c) Name the product formed when formaldehyde undergoes Clemmensen reduction. **(2+2+1)**

38) a) Give the mechanism for the following reaction

$$C_2H_5OH \xrightarrow[443K]{H_2SO_4} CH_2 = CH_2 + H_2O$$

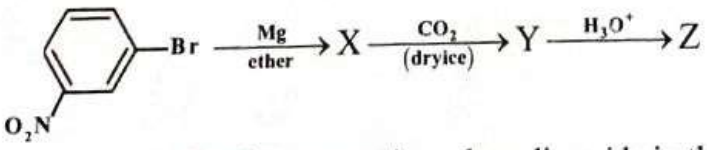
b) Explain Williamson ether synthesis with an example. **(3+2)**

39) a) Write the SN^1 mechanism for the conversion of 2-Bromo-2-methylpropane to 2-Methylpropan-2-ol and also write the order of the reaction.
b) Complete the following reaction and also name the reaction. **(3+2)**

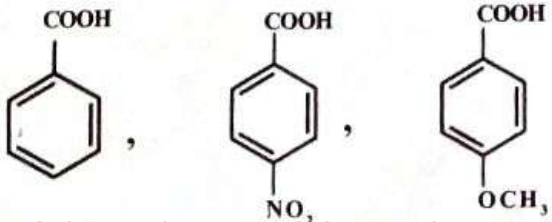


Diphenyl Fitting

40) a) Write the structures of X, Y and Z in the following reaction sequence.



b) Arrange the following aromatic carboxylic acids in the increasing order of their acidity. **(3+2)**



PART-E
(Numerical Problems)

VII Answer any THREE of the following. Each question carries three marks. 3x3=9

41) 18g of glucose is dissolved in 1 Kg of water in a saucepan. At what temperature will water boil at 1.013 bar ? [K_b for water is 0.52 K kg mol^{-1}, Molar mass of glucose is 180g mol^{-1}]

42) Vapour pressure of chloroform and dichloromethane at 298K are 200 mm Hg and 415 mm Hg respectively. Calculate the Vapour pressure of the solution prepared by mixing 25.5g of chloroform and 40g of dichloromethane at 298 K. [Molar mass of chloroform is 85 g mol^{-1}, Molar mass of dichloromethane is = 119.5g mol^{-1}]

43) Calculate the emf of the cell in which the following reaction takes place.

$$Ni_{(s)} + 2Ag^{+}_{(0.002M)} \longrightarrow \underset{(0.160\ M)}{Ni^{2+}} + 2Ag_{(s)}$$

Given $E^{0}_{cell} = 1.05$ V at 298 K.

44) $\Lambda^{\circ}m$ for NaCl, HCl and CH_3COONa are 126.4 $Scm^2\ mol^{-1}$, 425.9 $Scm^2\ mol^{-1}$ and 91.0 $Scm^2\ mol^{-1}$ respectively. Calculate $\Lambda^{\circ}m$ for CH_3COOH.

45) Time required to decompose SO_2Cl_2 to half of its initial amount is 60 minutes. If the decomposition is a first order reaction. Calculate the rate constant of the reaction.

46) The rate of a reaction quadruples when the temperature changes from 293 K to 313 K. Calculate the energy of activation of the reaction [Given R = 8.314 $JK^{-1}mol^{-1}$]

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Collection Of Question Papers For POCKET MARKS 70/70

GOVERNMENT OF KARNATAKA

DEPUTY DIRECTOR, DEPT. OF SCHOOL EDUCATION (PRE-UNIVERSITY)

PUC-II YEAR PREPARATORY EXAMINATION-2025

Time : 3 Hours | SUBJECT : CHEMISTRY (34) | MARKS : 70

DISTRICT : BIDAR

Instructions : 1) The question paper has five parts All parts are compulsory.
2) a) PART-A Carries 20 marks, Each question carries 1 mark. b) PART-B Carries 06 marks, Each question carries 2 marks, c) PART-C Carries 15 marks, Each question carries 3 marks, d) PART-D Carries 20 marks, Each question carries 5 marks. e) Part-E carries 09 marks, each question carries 3 marks.
3) In Part-A questions, **First attempted answer** will be considered for awarding marks.
4) Write Balanced chemical equations and draw neat labeled diagrams & graphs wherever necessary.
5) Direct answers to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.
6) Use log tables and simple calculator if necessary. (Use of scientific calculator is not allowed)
7) For a question having circuit diagram/ figure/ graph/ diagram, alternate questions are given at the end of question paper in a separate section for visually challenged students.

PART - A

I. Select the correct option from the given choices : 15X1=15

1) Which one of the following is not a solid solution
   a) Hydrogen in palladium b) Camphor in nitrogen gas
   c) Amalgam of mercury & sodium d) Copper in Gold

2) The most stable manganese compound is
   a) Mn_2O_7 b) MnF_4 c) MnO_2 d) Mn_2SO_4

3) Glycine is an optically inactive α-amino acid due to
   a) Presence of asymmetric carbon atom b) Absence of asymmetric carbon atom
   c) α-carbon attached to 4 different groups d) Its acidic nature

4) Tertiary alkyl halides are least reactive towards SN^2 reaction because of
   a) Inductive effect b) Steric effect c) Resonance effect d) Electromeric effect

5) Statement I : Cu displaces H_2 gas from dilute acids.
   Statement II : CU^{2+} ions get reduced more easily than H^+ ions.
   a) Both statement I and II are correct b) Both statement I and II are incorrect
   c) Statement I is correct and Statement II is incorrect d) Statement I is incorrect and statement II is correct

6) The rate constant of a reaction is $K=2.3\times10^{-5}$ $molL^{-1}S^{-1}$. The order of reaction is
   a) zero b) 1 c) 2 d) 3

7) O-nitrophenol and p-nitrophenol are separated by
   a) Sublimation b) Fractional distillation c) Crystallisation d) steam distillation

8) The most suitable reagent for the conversion For $R\text{-}CH_2OH \rightarrow R\text{-}CHO$ is .....
   a) $KMnO_4$ b) $K_2Cr_2O_7$ c) Cr_2O_3 d) PCC

9) The magnitude of CFSE (crystal field splitting complex, Δ_o) can be related to the configuration of d-orbitals in a coordination entity is
   a) If $\Delta_o<P$, the configuration is $t^3_{2g}\, e^1_g$ b) If $\Delta_o>P$, the configuration is $t^3_{2g}\, e^1_g$
   c) If $\Delta_o>P$, the configuration is $t^2_{2g}\, e^2_g$ d) If $\Delta_o<P$, the configuration is $t^4_{2g}\, e^0_g$

10) The oxidation number of Cu in $[Cu(CN)_4]^{3-}$ is
   a) +1 b) +4 c) +2 d) +3

11) Match the following given in list I with list II

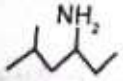
List I	List II
A) Wolff Kishner reduction	i) $SnCl_2.HCl/H_3O^+$
B) Clemmensen reduction	ii) Zn–Hg / Conc.HCl
C) Brady's reagent	iii) $NH_2\text{-}NH_2$/KOH/Ethylene glycol
D) Stephen's reduction	iv) 2.4-DNPH

   a) A-(i), B-(ii), C-(iii), D-(iv)
   b) A-(iii), B-(ii), C-(iv), D-(i)
   c) A-(iii), B-(iv), C-(ii), D-(i)
   d) A-(i), B-(iii), C-(ii), D-(iv)

12) An organic compound with the molecular formula $C_9H_{10}O$ forms 2,4-DNP derivative, reduces Tollens reagent and undergoes Cannizzaro reaction. On vigorous oxidation it given 1, 2-benzenedicarboxylic acid.
   a) 3-ethyl benzaldehyde b) 2-ethyl benzaldehyde
   c) 4-ethyl benzaldehyde d) 2, 3-dimethyl benzaldehyde

3) In a reaction $Hg + Cl_2 \rightarrow HgCl_2$, the rate of disappearance of Hg is equal to
   a) Rate of disappearance of Cl_2 b) Rate of appearance of $HgCl_2$
   c) Rate of appearance of Cl_2 d) Both (a) and (b)

) What is the IUPAC name of the following compound ?



   a) 2-methyl-4-hexanamine b) 2-methyl-3-hexanamine
   c) 2-methyl-4-aminohexane d) 5-methyl-3-aminohexane

Amongst the following the strongest base in aqueous medium is .....
a) CH_3NH_2 b) $(CH_3)_2N$ c) $C_6H_5NH_2$

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Collection Of Question Papers For POCKET MARKS 70/70

II. Fill in the blanks by choosing the appropriate word from those given in the brackets : 5X1=5
(instantaneous, methanol, ethoxy benzene, radioactive, phenoxy ethane, carbohydrate)

16) The chemical name of wood spirit is .....
17) The rate at a particular moment of time is expressed as ..... rate of reaction.
18) Most of the actinides are .....
19) The IUPAC name of $C_6H_5OC_2H_5$ is .....
20) Glucocorticoids control the ..... metabolism.

PART-B

III. Answer ANY THREE of the following. Each question carries two marks. 3X2=6

21) What is lanthanoid contraction ? What is the common oxidation state of Lanthanides ?
22) Complete the following reactions and name the reaction. $CH_3-Br+AgF \longrightarrow ? + ?$
23) What are the products of electrolysis of molten sodium chloride at cathode & anode ?
24) Write the reactions show that glucose contains. a) Five hydroxyl groups b) Aldehyde group
25) Write the reactions involved in preparation of phenol from cumene.

PART-C

IV. Answer ANY THREE of the following. Each question carries three marks. 3X3=9

26) Define crystal field spliting. Sketch the energy level diagram for the crystal field spliting of d-orbitals in a octahedral complex.
27) Write the equations for the preparation of potassium permanganate from pyrolusite ore. What is the colour of $KMnO_4$ crystals ?
28) On the basis of valence bond theory (VBT). explain the hybridisation, geometrical shape and magnetic property of $[Co(NH_3)_6]^{3+}$, hexaammine cobalt (III) ion. [Atm.no.of Co=27]
29) Write the IUPAC name of $[Fe(NH_3)_2(CN)_4]$. Draw the geometrical isomers for this complex.
30) Explain the catalytic properties of transition metals.

V. Answer ANY TWO of the following. Each question carries three marks. 2X3=6

31) Draw the neat labeled diagram of Normal Hydrogen Electrode (NHE). Write the electrode reaction and symbolic notation of standard hydrogen electrode.
32) Derive an expression for integrated rate equation for a zero order reaction.
33) What is the effect of temperature and pressure on solubility of solid in liquid ?
34) Write the reactions occurred at anode cathode and overall cell reaction in lead-storage battery.

PART-D

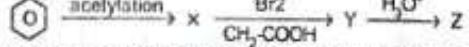
VI. Answer ANY FOUR of the following. Each question carries five marks. 4X5=20

35) a) Write the mechanism involved in the conversion of 2-bromo-2methyl propane to 2-methyl propan-2-01.
b) Explain Saytzeff rule with an example. (3+2)

36) a) Complete the following reactions. i) $CH_3-MgBr+CO_2 \longrightarrow ?$
ii) $CH_3-COOH+SOCl_2 \xrightarrow{Pyridine} ?$
iii) $CH_3-COOH+NH_3 \xrightarrow{\Delta} ?$
b) The pKa values of acetic acid, benzoic acid and trifluoroacetic acid are 4.76, 4.19 and 0.23 respectively. Arrange them in the increasing order of acid strength. (3+2)

37) a) How would you distinguish 1°, 2° and 3° alcohols by using Lucas reagent ?
b) How do you prepare ethanol from acetic acid ? (3+2)

38) a) i) What are non-essential amino acids ? ii) What are Zwitter ions ?
iii) Name the disease caused due to the deficiency of Vitamin B_{12}.
b) Write the Haworth structure of α-D-(+)-Glucopyranose. (3+2)

39) a) Identify the products X, Y and Z in the following conversion. 
b) Explain Hoffmann bromamide degradation reaction by taking acetamide as an example. (3+2)

40) a) An organic compound (X) with molecular formula C_8H_8O forms an orange-red precipitate with 2, 4-DNP reagent and gives yellow precipitate on heating with iodine in the presence of NaOH. It neither reduces Tollen's reagent nor does it decolourise bromine water. On oxidation with chromic acid, X gives a carboxylic acid (Y) having molecular formula. $C_7H_6O_2$. Identify the compounds (X) and (Y) and write all the reactions involved. (5)

PART-E (Numerical Problems)

VII. Answer ANY THREE of the following. Each question carries three marks. 3X3=9

41) The osmotic pressure of blood is 7.65 atom at 37°C. How much glucose should be used per litre for an intravenous injection that is to have the same osmotic pressure as blood ? (Molar mass of glucose=180g/mol^{-1})
42) Calculate the mole fraction of ethylene glycol ($C_2H_6O_2$) in a solution containing 20% of $C_2H_6O_2$ by mass.
43) Using the Nernst equation for the following cell at 298K and calculate the EmF. $Al|Al^{+3}_{0.001m}||Cu^{+2}_{0.0001m}|Cu$; Given $E^{\circ}_{Al^{+3}/Al}=-1.66V$ $E^{\circ}_{Cu^{2+}/Cu}=+0.34V$.
44) How much charge is required to reduce a) 1 mole of Al^{3+} to Al b) 1 mole of MnO_4^- to Mn^{2+} ?
45) The rate constant of a reaction at 500K and 700K are 0.02S^{-1} and 0.07S^{-1} respectively. Calculate the energy of activation of the reaction.
46) The rate constant of a first order reaction is $3\times10^{-3}S^{-1}$. Calculate the concentration of the reactant after 30 minutes it the initial concentration is 0.5m.

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SECOND PUC PREPRATORY EXAMINATION , JANUARY-2025

CHAMARAJA NAGARA (D)

Subject : CHEMISTRY(34)

Time: 3.00 Hours **Maximum Marks:** 70

Instructions

DISTRICT : CHAMARAJANAGAR

1. Question paper has FIVE parts. All parts are compulsory.
2. a. Part-A carries 20 marks. Each question carries 1 mark.
   b. Part-B carries 06 marks. Each question carries 2 marks.
   c. Part-C carries 15 marks. Each question carries 3 marks.
   d. Part-D carries 20marks. Each question carries 5 marks.
   e. Part-E carries 09 marks. Each question carries 3 marks.
3. In Part-A questions, **first attempted answer** will be considered for awarding marks.
4. Write balanced chemical equations and draw neat labeled diagrams and graphs wherever necessary.
5. Direct answers to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.
6. Use log tables and simple calculator if necessary (use of scientific calculator is not allowed).
7. For a question having circuit diagram/figure/ graph/ diagram, alternate questions are given at the end of question paper in a separate section for visually challenged students.

PART-A

I. Select the correct option from the given choices. **15 ×1 = 15**

1 During osmosis, the solvent molecules are moving from
a) Hypertonic solution to isotonic solution
b) Hypertonic solution to hypotonic solution
c) Higher concentrated solution to lower concentrated solution
d) lower concentrated solution to Higher concentrated solution.

2. E_{cell} of Daniel cell is calculated by using the following formula
a) $E_{cell}=E^0_{cell}-0.0295\log(Cu^{2+}/Zn^{2+})$ b) $E_{cell}=E^0_{cell}-0.0295\log(Cu/Zn^{2+})$
c) $E_{cell}=E^0_{cell}-0.0295\log(Zn^{2+}/Cu^{2+})$ d) $E_{cell}=E^0_{cell}-0.0295\log(Cu^{2+}/Zn)$

3.Which of the following factor does not affect the rate of reaction ?
a) molecularity b) temperature
c) catalyst d) concentration of reactant

4.The collision frequency in a reaction is depends on
a) Number of moles of reactants b) Proper orientation c) activated reactant molecules d) both (b) and (c)

5. Diamagnetic compound among the following is
a) Cu_2O b) MnO_2 c) V_2O_3 d) FeO

6. In metal carbonyls the M-C sigma bond formed by the donation of lone pair of electrons on the
a) Carbonyl carbon atom to filled orbital of metal
b) Carbonyl carbon atom to vacant orbital of metal
c) filled d-orbital of metal to vacant antibonding pi orbital of CO
d) filled d-orbital of metal to vacant bonding pi orbital of CO

7. IUPAC name of $[CoCl(en)_2ONO]Br$ is
 a) chloridoethylendiaminenitroCobalt(III) Bromide
 b) chloridoethylendiaminenitroCobaltate(III) Bromide
 c)) chloridobis(ethylendiamine)nitritoCobaltate(III) Bromide
 d) chloridobis(ethylendiamine)nitritoCobalt(III) Bromide)

8. When 2-Bromo pentane is treated with alcoholic potash ,the major product produced
 a) 1-Pentene b) 2-Pentane c) 2-pentene d) 3-pentene
9. **Statement I:** Enantiomers are non-superimposable mirror images on each other.
 Statement II: A racemic mixture shows zero optical rotation.
 Identify the correct statement
 a) Both statement I and II are correct
 b) Both statement I and II are incorrect
 c) Statement I is correct and statement II is incorrect.
 d) Statement I is incorrect and statement II is correct.
10. The major product formed when phenol is treated with excess of bromine water is
 (i) o-bromophenol (ii) p- bromophenol (iii) picric acid (iv) 2,4,6- tribromophenol

11. which of the following product produced when alcoholic solution of sodium methoxide reacts with chloroethane.
 a) Methoxy ethane b) Ethoxy ethane c) Ethoxy methane d) Methoxy benzene
12.

Identify the reagent For the Gatterman-Koch reaction	a) $SnCl_2$, HCl/ H_3O^+ b) CrO_2Cl_2/ H_3O^+ c) CO, HCl/Anhyd.$AlCl_3$ d) H_2/ Pd-$BaSO_4$

13. The following test can be used to identify both aldehydes and ketones
 a) Tollen's test b) iodofarm test c) Fehling's test d) lucas test
14. When benzene diazonium fluoroborate is heated with aqueous $NaNO_2$ the formation of
 a) Flouro benzene b) Nitro benzene c) Benzene d) Phenol.
15. Sulphur containing amino acid is;
 a) cysteine b) tyrosine c) histidine d) proline

II. **Fill in the blanks by choosing the appropriate word from those given in the brackets:**
(Hinsberg's catechol, hydrogen bonds , 6,16,8)

5×1= 05

16. Temperature coefficient of reaction is 2 , on increasing the temperature from 35°c to 65°c rate of reaction increased to ---------- times
17. The number of coordinate bonds formed by EDTA is ----------
18. The simplest di hydroxy derivative of benzene is _____.
19. Amines can be detected by using ---------- reagent
20. In DNA, the linkage between different nitrogenous bases is ----------

III. Answer ANY THREE of the following. Each question carries two marks. **3 × 2 = 06**

21. What is the effect of increasing the pressure and temperature on solubility of gas in liquid?
22. Write facial and meridional isomerism of $[Co(NH_3)_3(NO_2)_3]$
23. Explain Swartz reaction with an example.
24. Write the reactions involved in preparation of phenol from cumene.
25. Write the reactions indicates that glucose contains a) five hydroxyl groups b) aldehyde group.

PART-C

III. Answer ANY THREE of the following. Each question carries three marks. **3 × 3 = 09**

26. Write the equations for the preparation of potassium permanganate from MnO_2. what is the colour of $KMnO_4$ crystals?

27. a) Mention two reasons ,why d-block elements/ions/compounds are used as catalysts?

b) write the structure of $Cr_2O_7^{2-}$

28. a) Write any two differences between Lanthanoids and Actinoids.

b)Write the product formed when lanthanoids reacts with Water.

29.Using Valence Bond Theory [VBT], explain geometry, hybridization and magnetic property of $[Ni(CN)_4]^{2-}$ ion. [Atomic number of Nickel is 28].

30. a) What is linkage isomerism ? give an example.

b) Mention the geometry of $Fe(CO)_5$

IV .Answer ANY TWO of the following. Each question carries three marks. **2 × 3 = 06**

31 a) What is Azeotropic mixture ,give an example for maximum boiling mixture.
b) Mention the physical state of the solvent in Zinc amalgam .

32 .a) State Kohlrausch law of independent migration of ions
b) How molar conductivity is varied with decreasing the concentration of electrolytic solution ?

33. a) Draw the neat labelled diagram of hydrogen-oxygen fuel cell. Write reaction occurring at cathode and anode.

34. Derive the expression for the rate constant of I order reaction.

PART-D

V. Answer ANY FOUR of the following. Each question carries five marks. **4 × 5 = 20**

35. a) Explain the mechanism involved in the conversion of tert- butyl bromide to tert- butyl alcohol.

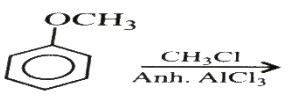
b)Identify A and Name the reaction.



(3+2)

36.a) Write the equations involved in the mechanism of acid catalysed dehydration of Ethanol to Ethene.

b) Complete the reaction



(3+2)

37. a) Between Methanal and Ethanal, which would undergo aldol condensation? Write the chemical reaction involved in it.
b) How do you convert propanone to propane ? write the reaction. (3+2)

38. a) Write the reaction and name the products obtained when Acetophenone reacts with sodium hypochlorite .

b) Explain Hell-Volhard-Zelinsnky reaction. (3+2)

39. a) By taking Benzamide , Explain Hoffmann bromamide degradation reaction.

b) Write the reaction , when phenol in NaOH reacts with Benzene Diazonium chloride

c) Aniline is less basic than Methanamine. Give One reason. (2+2+1)

40. a) Write Haworth's structure of sucrose.

b) What are Nucleotides? Mention the heterocyclic base present only in RNA but not in DNA.

c) Which vitamin deficiency causes the increased fragility of RBC's and muscular weakness. (2+2+1)

PART–E

VI.Answer any THREE of the following. Each question carries three marks. 3 × 3 = 09

41. Calculate the mass of Vitamin C (molecular mass 196g) to be dissolved in 78 g of acetic acid .The depression of freezing point is 1.5°C.(Given: K_f of acetic acid is 3.9 K kg mol^{-1})

42. At 373 K, the vapour pressures of the 100 g Heptane(C_7H_{16}) is 105.2 kPa. it is lowered to 104.1Kpa on adding 3.5 g non volatile solid to Heptane .calculate molar mass of non volatile solid .

43. Calculate the Gibbs free energy change for the reaction takes place in an electrochemical Cell obtained by combining Aluminium and Zinc single electrodes . Given that SRP of Aluminium and Zinc are – 1.66V and -0.76V respectively .(1F=96500C)

44. How long did the current flow ? When the strength of current 1.5 amperes was passed through the solution of silver nitrate to deposit 1.45 g of silver . [Atomic mass of silver = 108].

45. The rate of a reaction quadruples when the temperature changes from 293 K to 313 K. Calculate the energy of activation of the reaction assuming that it does not change with temperature(R=8.314J/K/mol)

46. The rate constant for I order reaction is 60 $X10^{-3}$ s^{-1}. How much time will it take to reduce the initial concentration of the reactant to its $1/16^{th}$ value?

Collection Of Question Papers For POCKET MARKS 70/70

DISTRICT P.U. COLLEGE PRINCIPALS' ASSOCIATION, CHIKKABALLAPUR.

SECOND PUC PREPARATORY EXAMINATION JANUARY -**2025**

Time: **3-00 hours** | **CHEMISTRY (34)** | Max Marks : **70**

No.of pages: **04** | Total No.of Ques: **49**

Instructions: 1] Question paper has five parts, A, B, C, D & E.
2] Part-A carries 20 marks. Each question carries 1 mark.
Part-B carries 6 marks. Each question carries 2 marks.
Part-C carries 15 marks. Each question carries 3 marks.
Part-D carries 20 marks. Each question carries 5 marks.
Part-E carries 9 marks. Each question carries 3 marks. All the parts are compulsory.
3] Write balanced chemical equations and draw neat labelled diagrams wherever necessary.
4] For Part-A questions ,only the first written answer will be considered for evaluation.
5] Use log tables and the simple calculators if necessary. (Use of scientific calculator is not allowed

DISTRICT : CHIKKABALLAPURA

PART-A

I **Select the correct option among the four given options for ALL the following questions.** **15x1=15**

1) The condition caused when Scuba divers went into deep sea water is _____
a] anoxia b] Hemophilia c] bends d] None

2) The alcohol formed when Ketone is treated with Grignard reagent [R- MgX] is ___
a] Primary alcohol b] Secondary alcohol
c] Tertiary alcohol d] Quarternary salt

3) If abnormal molar mass is more than normal molar mass the Van't Hoff factor (i) is
a] $i > 1$ b] $i = 1$ c] $i < 1$ d] $i \geq 1$

4) Match the following

	Battery	Anode
(i)	Leclanche	a] Pb
(ii)	Mercury cell	b] Dihydrogen (H_2)
(iii)	Lead Storage battery	c] Zn - Hg
(iv)	H_2- O_2- Cell	d] Zn

The correct answer is _____
a] i-a, ii-b, iii-c, iv-d b] i-b, ii-a, iii-d, iv-c
c] i-d, ii-c, iii-b, iv-a d] i-d, ii- c, iii-a, iv-b

5) In coordination compound [$CoCl_2(en)_2$] Br, the primary and secondary valencies of Co are____
a] 4 and 1 b] 6 and 1 c] 2 and 3 d] 3 and 6

6) The increasing order of boiling points of alkylhalides is_____
a] RF > RCl > RBr > RI b] RF > RI > R-Cl> R-Br
c] RI > RBr > R-Cl > R-F d] R-Cl > RBr > RF> RT

7) Formalin is a _____
a] 38% solution of Acetic acid b] 40% solution of Formic acid
c] 40% solution of Formaldehyde d] 40% solution of acetaldehyde

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8) The P^{Ka} vales of trifluoroacetic acid, benzoic acid and acetic acid are 0.23, 4.19 and 4.76 respectively. The more stronger acid is _____

a] Acetic acid b] Benzoic acid c] Trifluoroacetic acid d] None

9) The correct order of boiling points of Primary amine , Secondary amine and tertiary amine are_____

a] Tertiary > Secondary > Primary b] Primary > Secondary >Tertiary

c] Secondary >Tertiary > Primary d] Primary >Tertiary >Secondary

10) Lactose is a disaccharide made up of ___

a] β-D Galactose and α -D Glucose

b] β-D Galactose and β -D Glucose

c] α-D Galactose and α-D Glucose

d] β-D Glucose and β -D Fructose

11) The fat soluble vitamins stored in _____

a] Kidney and adipose tissue b] Liver and Kidney

c] Adipose tissue d] Liver only

12) The rate constant of a reaction is K= 2.3 x 10^{-5} $Lmol^{-1}$ S^{-1}. The order of a reaction is _____

a] 1 b] 2 c] 3 d] Pseudo first order

13) Potassium Permonganate oxidises sulphurous acid(H_2SO_3) into_____

a] S b] $S_2O_7^{-2}$ c] SO_4^{2-} d] SO_3^{2-}

14) Among $ScCl_3$, $TiCl_3$ and $ZnCl_2$, the coloured compound is _____

a] $ScCl_3$ b] $TiCl_3$ c] $ZnCl_2$ d] All the above

15) The isomerism exhibited by complexes [$Co(NH_3)_5SO_4$] Br and [$Co(NH_3)_5Br$] SO_4 is _____

a] Linkage isomerism b] Coordination Isomerism

c] Ionisation isomerism d] Solvate isomerism

II Fill in the blanks using appropriate answers given in brackets: **5x1=5**

[Uracil, Diphenyl, Williamson's reaction, Increases, Benzozuinone]

16) When a solute is added to solvent , its boiling point _____

17) The compound formed when phenol is oxidised with sodium dichromate is ____

18) When chlorobenzene is heated with sodium metal and dry ether, _____ is formed.

19) When methyl chloride is heated with sodium ~~metholide,~~ methoxide to form ~~metholy~~ methoxy methane this is _____ reaction.

20) The nitrogen base present in RNA but not in DNA is _____

Cont...

PART-B

III **Answer any THREE of the following questions , each carries 2 marks. 3x2=6**

21) State Henry's law. Give one application of it .

22) What is Pseudo first order reaction? Give one example.

23) Define ambidentate Ligand with one example.

24) What is Swarts reaction? Write its general reaction.

25) Find product " A" in the reaction $CH_3-\overset{O}{\overset{\|}{C}}-Cl \xrightarrow{H_2/\ Pd/\ BaSO_4} A$ & Name the reaction

26) What are essential amino acids? Give one example.

PART-C

IV **Answer any THREE of the following questions , each carries 3 marks. 3x3=9**

27) Calculate the number of unpaired electrons present in a complex of magnetic moment $\mu = 4.90$ B.M.

28) Give the reactions involved in the preparation of potassium dichromate from chromite.

29) The atomic radii of Zirconium and Hoffnium are same. Explain.

30) Give the IUPAC names of followings compounds.
(i) $Co(NH_3)_4(H_2O)Cl]Cl_2$ (ii) $K_2[Zn(OH)_4]$ (iii) $K_3[Al(C_2O_4)_3]$

31) Using Valence Bond theory explain Geometry, Hybridisation and Magnetic property of $[Ni(CN)_4]^{2-}$ [Atomic Number of Ni = 28]

32) Explain Synergic bond with example.

V **Answer any TWO of the following questions , each carries 3 marks. 2x3=6**

33) Explain desalination of sea water.

34) Corrosion [Rusting of Iron] is an electrochemical phenomenone. Explain.

35) Describe H_2-O_2 fuel cell with electrode reaction.

36) Derive integrated rate equation of first order reaction with graphical representation.

PART-D

VI **Answer any FOUR of the following questions , each carries 5 marks. 4x5=20**

37) a] Write the mechanism involved in nucleophilic substitution reaction of tertiary butyl bromide to form tertiary butyl alcohol.

b] Define Stereo centre and chirality.

38) a] Find A, B and C, $CH_3COOH \xrightarrow{LiAlH_4} A \xrightarrow{\Delta,\ Cu} B \xrightarrow{Dil.\ NaOH} C$

b] What is Esterification? Give one example.

39) a] An organic compound of molecular formula C_6H_6O on heating with sodium hydroxide compound 'X' is formed . This on heating with carbon dioxide [CO_2] compound 'Y' is formed, followed by acidification compound 'Z' is formed. Find X,Y and Z.

b] Explain Friedel crafts acylation reaction of anisole.

P.T.O.

40) a] Name the product formed with reaction when benzaldehyde (C_6H_5CHO) is heated with acetophenone and dilute sodium hydroxide solution[NaOH].

b] Explain Stephen reaction of preparation of an aldehyde.

41) a] When a Grignard reagent R-MgX is heated with CO_2, followed by acid hydrolysis compound 'B' is formed when 'B' is heated with Soda Lime [NaOH + CaO] compound 'C' is formed. Find compounds B and C . Write reaction.

b] What is the effect of electron donating group on the acid strength of a carboxylic acid.

42) a] How do you prepare Primary amine by Gabriel Phthalamide synthesis. Write its reaction.

b] Explain Carbyl amine reaction with example.

43) a] Write Haworth structure of Sucrose.

b] Explain tertiary structure of proteins.

c] How do you show that Glucose contains an aldehyde group?

PART-E

VII Answer any THREE of the following questions , each carries 3 marks. 3x3=9

44) The boiling point of pure benzene is 358.24K. When 1.9g of a non volatile solute was dissolved in 95g of benzene [molar mass = 78], the boiling point is raised to 359.46K. Calculate the molar mass of solute[K_b for benzene = 2.53 K Kg mol^{-1}]

45) The vapour pressure of pure benzene is 0.850 bar. A non-volatile , non electrolyte solid weighing 0.5g when added to 39g of benzene [molar mass = 78gmol^{-1}], vapour pressure of solution then is 0.845 bar.
What is the molar mass of solute (solid).

46) Represent the cell in which the following reaction takes place and calculate E.m.f. of cell.

$$Mg_{(s)} + 2Ag^{+}_{(0.0001M)} \longrightarrow Mg^{2+}_{(0.130M)} + 2Ag_{(s)}$$

$$E^0_{cell} = +3.17V$$

47) λ^0_m for NaCl , HCl and CH_3COONa are 126.4, 425.9 and 91.0 Scm^2mol^{-1} respectively. Calculate λ^0 of CH_3COOH.

48) For a first order reaction, show that time required for 99% completion is twice the time required for completion of 90% of reaction.

49) The rate of a reaction triples when temperature changes from 293K to 315K. Calculate the energy of activation (E_a).

✦✦✦✦✦

PUCPACKM
II PUC Preparatory examination Jan-2025
Subject: CHEMISTRY (34)

Time:3.00 hours. **Max. marks:70**

DISTRICT : CHIKKAMAGALURU

INSTRUCTIONS:
1. Question paper has **FIVE parts.** All parts are compulsory.
2. In PART-A questions, **first attempted answer** will be considered for awarding marks.
3. Write balanced chemical equations and draw neat labelled diagrams and graphs wherever necessary.
4. Direct answers to the numerical problems without detailed specific unit for final answers will not carry any marks.
5. Use log tables and simple calculator if necessary. (Use of scientific calculator is not allowed).

PART-A

I. Select the correct option from the given choices. **[15×1=15]**

1. The compound that reacts fastest with Lucas reagent at room temperature is
a) butan-1-ol b) butan-2-ol c) 2-methylpropan-1-ol d) 2-methylpropan-2-ol

2. Which of the following vitamins are soluble in water?
a) A b) C c) D d) E

3. According to spectrochemical series, the strongest field ligand is
a) CO b) NH_3 c) H_2O d) F^-

4. Statement I: Enantiomers possess different physical properties like melting point, refractive index etc.
Statement II: Equimolar mixtures of two enantiomers are called racemic mixtures.
Identify the correct statement
a) Both Statement I and II are correct
b) Both Statement I and II are incorrect
c) Statement I is correct and Statement II is incorrect.
d) Statement I is incorrect and Statement II is correct.

5. In the reaction $A+3B \rightarrow 2C$, the rate of formation of C is
a) same as rate of consumption of A b) same as rate of consumption of B
c) twice the rate of consumption of A d) 3/2 times the rate of consumption of B

6. The stability of $Cu^{2+}_{(aq)}$ rather than $Cu^{+}_{(aq)}$ is due to
a) more positive $\Delta_{hyd}H$ of $Cu^{+}_{(aq)}$ compensates second ionisation enthalpy of Cu.
b) more negative $\Delta_{hyd}H$ of $Cu^{+}_{(aq)}$ compensates second ionisation enthalpy of Cu.
c) more positive $\Delta_{hyd}H$ of $Cu^{2+}_{(aq)}$ compensates second ionisation enthalpy of Cu.
d) more negative $\Delta_{hyd}H$ of $Cu^{2+}_{(aq)}$ compensates second ionisation enthalpy of Cu.

7. The standard reduction potential of three metals X, Y and Z are -1.2 V, +0.5 V and -3.0 V respectively. The reducing power of these metals will be
a) Y> Z > X b) X >Y> Z c) Z >X >Y d) X > Y> Z

8. Anisole on reaction with HI forms
a) Phenol and Iodomethane b) Iodobenzene and methanol
c) Benzene and Iodomethane d) Phenol and methanal

9. The correct order of osmotic pressure of 0.01M aqueous solution of the following is
1) Sucrose > CH_3COOH > KCl 2) CH_3COOH > Sucrose > KCl
3) Sucrose > KCl > CH_3COOH 4) KCl > CH_3COOH > Sucrose

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10. Match the column-I with column-II and choose the correct answer using the codes given below:

Column-I (Conversion)	Column-II (Number of Faraday required)
(A) 1 mol of H_2O to O_2	(p) 3F
(B) 1 mol of MnO_4^- to Mn^{2+}	(q) 2F
(C) 1 mol of Al^{3+} to Al	(r) 1F
(D) 1 mol of FeO to Fe_2O_3	(s) 5F

a) (A)-q; (B)-s; (C)-p; (D)-r
b) (A)-r; (B)-s; (C)-p; (D)-q
c) (A)-q; (B)-r; (C)-p; (D)-s
d) (A)-r; (B)-s; (C)-q; (D)-p

11. What happens when a carboxylic acid is reduced with $LiAlH_4$?
a) Aldehyde is formed
b) Primary alcohol is formed
c) Ketone is formed
d) Grignard reagent is formed

12. Which of the following reactions could not be explained on the basis of open chain structure of glucose?
a) Pentaacetate of glucose does not react with NH_2OH
b) Glucose on prolonged heating with HI gives n-Hexane
c) Glucose on oxidation with bromine water forms gluconic acid
d) With acetic anhydride glucose gives glucose pentaacetate

13. Arrange the following compounds in the increasing order of their boiling points.
I. $CH_3CH_2CH_2Br$ II. $CH_3CH_2CH_2CH_2Br$ III. $(CH_3)_2CHCH_2Br$ IV. $(CH_3)_3CBr$
a) II<I<III<IV b) I<III<IV<II c) IV<III<II<I d) I<IV<III<II

14. Which statement is not correct for Benzene sulphonyl chloride?
a) It is known as Hinsberg's reagent.
b) It is used to distinguish primary and secondary amines.
c) On treatment with secondary amine, it leads to form a product that is soluble in alkali.
d) It doesn't react with tertiary amines

15. Ammonolysis involves
a) electrophilic addition reaction.
b) electrophilic substitution reaction.
c) nucleophilic addition reaction.
d) nucleophilic substitution reaction.

II. Fill in the blanks by choosing the appropriate word from those given in the brackets. [5 X 1=5]
[zero, one, two, three, Primary alcohol, Primary amine]

16. Formaldehyde when reacted with methyl magnesium bromide followed by hydrolysis gives_____
17. For a reaction, Rate constant k $=10^{-4}$ $mol.L^{-1}s^{-1}$. The order of the reaction is _____
18. Nitriles on catalytic hydrogenation produce_____
19. The magnetic moment of transition metal ion is found to be 3.87 BM. The number of unpaired electrons present in it is_____
20. The Van't Hoff factor for 0.01M $KCl_{(aq)}$ is_____

PART - B

III. Answer ANY THREE of the following. Each question carries two marks. [3 X 2=06]

21. Explain Swarts reaction with an example.
22. What does P and Z_{AB} represent in the equation: Rate = $PZ_{AB}\, e^{-\frac{E_a}{RT}}$?
23. How does Phenol react with conc. Nitric acid? Give equation.
24. Write the Haworth structure of maltose.
25. What is the common oxidation state shown by Lanthanoids? Mention any one consequence of Lanthanoid contraction.

PART -C

IV. Answer ANY THREE of the following. Each question carries three marks. [3 X 3 =09]

26. When MnO_2 is fused with an alkali metal hydroxide and an oxidising agent like KNO_3 to give dark green coloured paramagnetic substance 'B'. The compound 'B' disproportionate in a neutral or acidic solution to give tetrahedral purple coloured compound 'C'. Identify the compound 'B' and write the balanced equations for the preparation of compound 'C' from MnO_2. (3)
27. Account for the following:
    i) Of the d^4 species, Cr^{2+} is strongly reducing while Mn^{3+} is strongly oxidising (2)
    ii) The transition metals generally form coloured compounds. (1)
28. Explain the hybridization, geometry and magnetic properties of $[CoF_6]^{3-}$ ion using VBT. (3)
29. What is crystal field splitting? Sketch the energy level diagram for the Crystal field splitting of d-orbitals in octahedral complex? (3)
30. a) Among tetrahedral and square planar complexes, which will not show geometrical isomerism? Write structures of geometrical isomers of $[Co(NH_3)_4(NO_2)_2]$

V. Answer ANY TWO of the following. Each question carries three marks. [2 × 3 = 06]

31. What are minimum boiling azeotropes? Give an example. What is the sign of $\Delta_{mix}H$ for such solutions?
32. During working of Leclanché cell, write the anodic and cathodic reactions. What is the role of produced ammonia during the cell reaction?
33. Derive integrated rate equation for first order gas phase reaction $A(g) \rightarrow B(g) + C(g)$.
34. a) Define limiting molar conductivity. How it is related to molar conductivity of strong electrolyte?
    b) Why conductivity decreases with decrease in concentration?

PART – D

VI. Answer ANY FOUR of the following. Each question carries five marks. [4 × 5 = 20]

35. a) Give the structures of 'B' and 'C' in the following reaction.

$$CH_3CH_2I \xrightarrow{NaCN} A \xrightarrow[\text{partial hydrolysis}]{OH^-} B \xrightarrow{NaOH+Br_2} C$$

    b) Give reasons for the following
    i) Aromatic primary amines cannot be prepared by Gabriel synthesis
    ii) Although amino group is o- and p- directing in aromatic electrophilic substitution reactions, aniline on nitration gives a significant amount of m-Nitroaniline.
    c) Name the aromatic compound produced when benzenediazonium chloride reacts with ethanol. [2+2+1]
36. a) Write equation for the reaction between benzaldehyde and conc. NaOH solution. Name the reaction.
    b) Explain preparation of propane by Wolff-Kishner reduction. Write chemical equation.
    c) Name The product formed by the oxidation of methyl benzene by alkaline $KMnO_4$. [2+2+1]
37. a) Write the mechanism for nucleophilic substitution reaction of tert- butyl bromide with aq. KOH.
    b) What happens when bromomethane is treated with sodium in the presence of dry ether? Name the reaction.
    c) Draw the structure of DDT. [2+2+1]
38. a) What is peptide bond? Give an example for dipeptide.
    b) What is denaturation of proteins? Mention the structure of protein which remains intact during this process.
    c) Name the monomer unit of Nucleic acids? [2+2+1]
39. a) Write the mechanism of acid catalysed dehydration of ethanol to ethene.
    b) Among Alcohol and Phenols which one is more acidic and why? [3+2]
40. a) Write the IUPAC name and structure of the product obtained when benzene reacts with acetyl chloride in presence of anhydrous $AlCl_3$.
    b) Aldehydes are more reactive than ketones in nucleophilic addition reactions. Give two reasons.
    c) Write one use of Tollens' reagent. [2+2+1]

PART – E
(NUMERICAL PROBLEMS)

VII. Answer ANY THREE of the following. Each question carries three marks. **[3 × 3 = 09]**

41. A solution containing 18 g of non-volatile non-electrolyte solute is dissolved in 200 g of water freezes at 272.07 K. Calculate the molecular mass of solute. Given K_f = 1.86 Kkg/mol, freezing point of water = 273.15 K.

42. Calculate the emf of the cell in which the following reaction takes place:
$Ni_{(s)} + 2Ag^{+}_{(aq)}(0.002M) \rightarrow Ni^{2+}_{(aq)}(0.160M) + 2Ag_{(s)}$. Given: $E^{\circ}_{(Ni^{2+}/Ni)} = -0.25V$ and $E^{\circ}_{(Ag^{+}/Ag)} = 0.8\,V$.

43. The molar conductivity of NaCl, HCl and CH_3COONa at infinite dilution are 126.45, 426.16 and 91 Scm^2mol^{-1} respectively. Calculate the limiting molar conductivity of CH_3COOH.

44. A first order reaction has a rate constant $1.15 \times 10^{-3}s^{-1}$. How long will 5 g of this reactant take to reduce to 3 g?

45. Calculate the mass of a non-volatile solute (molar mass 40 g mol^{-1}) which should be dissolved in 114 g octane to reduce its vapour pressure to 80%.

46. The rate of the chemical reaction doubles for an increase of 10K in absolute temperature from 298K. Calculate Ea.

Collection Of Question Papers For POCKET MARKS 70/70

DISTRICT LEVEL PREPARATORY EXAM JAN-2025

Class : II PUC **Maximum Marks:** 70

Subject: Chemistry (34) **Time:** 3.00 Hrs

DISTRICT : CHIKKODI

Instructions

1. Question paper has FIVE parts having 46 questions. All parts are compulsory.
2. A] Part-A carries 20 marks. Each question carries 1 mark.
   B] Part-B carries 06 marks. Each question carries 2 marks.
   C] Part-C carries 15 marks. Each question carries 3 marks.
   D] Part-D carries 20 marks. Each question carries 5 marks.
   E] Part-E carries 09 marks. Each question carries 3 marks.
3. In Part-A questions, **first attempted answer** will be considered for awarding marks.
4. Write balanced chemical equations and draw neat labelled diagrams and graphs wherever necessary.
5. Direct answers to the numerical problems without detailed steps and specific unit for final answer willnot carry any marks.
6. Use log tables and simple calculator if necessary (use of scientific calculator is not allowed).
7. For a question having circuit diagram/figure/ graph/ diagram, alternate questions are given at the end of question paper in a separate section for visually challenged students.

I. Select the correct option from the given choices. **15 × 1 = 15**

1. The solution which having lower osmotic pressure with respect to other is called_____

a) Isotonic solution b) Hypertonic solution c) Hypotonic solution d) None of these

2.The following factor which does not affect the rate of reaction is

a) Molecularity b) temperature c) catalyst d) concentration of reactant

3. Which of the following transition metal ions is colourless.?

a) V^{+2} b) Cr^{+3} c) Zn^{+2} d) Ti^{+3}

4. Which of the following ligands can exhibit Linkage isomerism.?

a)NO_2^- b) NH_3 c) H_2O d) CO

5.Chlorobenzene reacts with magnesium in dry ether to give a compound A is

a) C_6H_5OH b) C_6H_5MgCl c) $C_2H_5CH_2MgCl$ d) $MgCl_2$

6.When phenol is heated with chloroform in sodium hydroxide followed by acidification, the product is

a) chlorobenzene b) benzyl chloride c) salicyladehyde d) salicylic acid

7. Aldehyde which answers Cannizzaro's reaction does not contain

a) β-hydrogen b) α-hydrogen c) γ-hydrogen d) δ-hydrogen

8. Carbylamine reaction is answered by

a) Phenols b) Aldehyde c) 1^0-amines d)2^0-amines

9. Which of the following concentration term is dependant on temperature.?

a) ppm b) mole fraction c) molarity d) molality

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10. In galvanic cell

a) chemical energy is converted into heat

b) electrical energy is converted into heat

c) chemical energy is converted into electrical energy

d) electrical energy is converted into chemical energy

11. Which one of the following is a polysaccharide.?

a) Starch b) Maltose c) Fructose d) Glucose

12. Which of the following reagent is used in Etard's reaction.

a) $SnCl_2$ b) CrO_2Cl_2

c) Zn-Hg/Conc.HCl d) Pd-$BaSO_4$

13.The magnitude of CFSE (Crystal field splitting energy, Δ_o) can be related to the d^4 configuration of central metal in an octahedral coordination entity is

a) if $\Delta_o < P$, the configuration is $t^3_{2g}\ e^1_g$ b) if $\Delta_o > P$, the configuration is $t^3_{2g}\ e^1_g$

c) if $\Delta_o > P$, the configuration is $t^2_{2g}\ e^2_g$ d) if $\Delta_o < P$, the configuration is $t^4_{2g}\ e^0_g$

14. Which of the following alcohols will give the most stable carbocation during dehydration.?

a) 1-Butanol b) 2-Butanol c) 2-methyl-2-propanol d) 2-methyl-1-propanol

15.Ascorbic acid is a chemical name of

a) Vitamin A b) Vitamin D c) Vitamin K d) Vitamin C

II. Fill in the blanks by choosing the appropriate word given in the brackets: **5 × 1 = 05**

[dissociation, Phenol, first order, 4, Chiral, association]

16.A molecule that has a carbon atom bonded to four different groups is called _____carbon.

17. _____gives picric acid on nitration with fuming nitric acid.

18. Van't Hoff factor for a solute is more than 1 indicates that the solute undergoes _____in solution

19. Decomposition of N_2O_5 and N_2O are example of _____reaction.

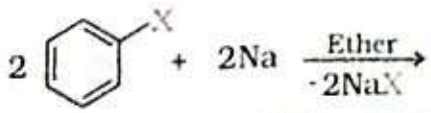
20.Secondary valency of Nickel in $[NiCl_4]^{2-}$ ion is_____.

PART-B

III. Answer ANY THREE of the following. Each question carries two marks. **3× 2 = 06**

21.What is lanthanoid contraction? Mention two consequences of lanthanoid contraction.

22.Complete the following equation and name the reaction.



23.State Henry's law.? Mention its one application.

24.Write the reactions to show that glucose contains a) five hydroxyl groups b) an aldehyde group

25. Write the equations for the reactions involved in the preparation of phenol from cumene.

Collection Of Question Papers For POCKET MARKS 70/70

PART-C

IV. Answer ANY THREE of the following. Each question carries three marks. **3 × 3 = 09**

26. Write the balanced equations for the preparation of potassium permanganate from MnO_2.

27. Using Valence bond theory, explain the hybridization, geometry and magnetic nature of $[Co(NH_3)_6]^{+3}$ ion. (Atomic number of Co =27)

28. Write any three postulates of Werner's theory of coordination compounds.

29. a) Calculate the magnetic moment of Ti^{3+} ion [Atomic number of Ti = 22]

b) Give reason : 3d series elements exhibit variable oxidation states.

30. Write the IUPAC names and the types of isomerism for the following complexes

a) $[Co(NH_3)_5Br]SO_4$ b) $[Co(NH_3)_5(SO_4)]Br$

V. Answer ANY TWO of the following. Each question carries three marks. **2 × 3 = 06**

31. Derive an integrated rate equation for first order reaction.

32. State Kohlrausch's law of independant migration of ions. Mention two applications of it.

33. Plot a graph of molar conductivity v/s $\sqrt{c}$ for strong and weak electrolytes in solution. For strong electrolytes, write the equation that represents the variation of molar conductivity with dilution.

34. Give any three differences between ideal and non ideal solutions.

PART-D

VI. Answer ANY FOUR of the following. Each question carries five marks. **4 × 5 = 20**

35. a) Explain the mechanism involved in the conversion of tertiary butyl bromide into tertiary butyl alcohol. 3

b) Give any two reason:Aryl halides are less reactive towards nucleophilic substitution reaction. 2

36. a) Write the Haworth structure of Maltose. 2

b) What is Fibrous protein.? Give an example. 2

c) Name the disease caused by the deficiency of vitamin-D. 1

37. a) Explain the mechanism of acid catalysed dehydration of ethanol to ethene. 3

b) Explain Stephen's reduction reaction. 2

38. a) An aromatic compound 'A' on treatment with aq. Ammonia and on heating forms compound 'B', which on heating with Br_2 and KOH forms a compound 'C' of molecular formula C_6H_7N, Write the names of compounds A, B and C. 3

b) Give reasons : 1) Aliphatic amines of low molecular mass are soluble in H_2O. 1

2) Methylamine is more basic trimethylamine 1

39.a) Give the chemical equations for the conversion of propanenitrile into corresponding ketone by using phenyl magnesium bromide. Write the IUPAC name of the product. 3

b) Explain Hell-Volhard-Zelinsky (HVZ) reaction with an example. 2

40.a) What is Lucas reagent? How does it is used to distinguish primary, secondary and tertiary alcohols. 3

b) How do you convert phenol to salicylic acid by Kolbe's process. 2

PART-E

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VII. Solve ANY THREE of the following . Each problem carries three marks. $3 \times 3 = 09$

41. The boiling point of benzene is 353.23K. When 1.8g of non-volatile solute was dissolved in 90g of benzene, the boiling point is raised to 354.11K, calculate the molar mass of the solute. (Given K_b for the benzene is 2.53K.kg.mol^{-1}).

42. The vapour pressure of water is 12.3kPa at 300K. Calculate the vapour pressure of one molal solution containing a solute dissolved in it.

43. The standard electrode potential for Daniel cell is 1.1 V. Calculate the standard Gibb's free energy change for the reaction: $Zn_{(s)} + Cu^{2+}{}_{(aq.)} \rightarrow Zn^{2+}{}_{(aq.)} + Cu_{(s)}$ (Given, F= 96487C/mol.)

44. The resistance of 0.01M acetic acid solution is found to be 2220 ohm when measured in a conductivity cell with cell constant 0.366cm^{-1}. Calculate conductivity and molar conductivity.

45. The rate of chemical reaction quadruples for an increase of temperature 303K from 323K. Calculate energy of activation of the reaction assuming that it does not change with temperature.(R=8.314 J.K^{-1}.mol^{-1})

46. The rate constant for a reaction is 60 s^{-1}. How much time will it take to reduce the initial concentration of the reactant to its 1/6th value.?

*****THE END*****

GG

DISTRICT LEVEL II PUC PREPARATORY EXAM, JANUARY – 2025

Time: 3 Hours **Sub: CHEMISTRY (34)** **Max. Marks: 70**

DISTRICT : CHITRADURGA

General Instructions:

1. The question paper has **FIVE** parts. All parts are compulsory.
2. Part – A carries 20 marks, each question carries 1 mark.
   Part – B carries 6 marks, each question carries 2 marks.
   Part – C carries 15 marks, each question carries 3 marks.
   Part – D carries 20 marks, each question carries 5 marks.
   Part – E carries 09 marks, each question carries 3 marks.
3. In Part – A questions, **first attempted answer** will be considered for avoiding marks.
4. Write balanced chemical equations and draw neat labelled diagrams and graphs wherever necessary.
5. Direct answers to the numerical problems without detailed steps and specific unit for final answer will not carry a marks.
6. Use log table and simple calculator if necessary. (Use of scientific calculator is not allowed).
7. For a question having circuit diagram / figure / graph / diagram, alternate questions are given at the end of quest paper in a separate section for Visually Challenged Students.

PART – A

I. **Select the correct option from the given choices:** **15 × 1 =**

1. **The solubility of a gas in water depends on**
   (A) Nature of the gas
   (B) Temperature
   (C) Pressure of the gas
   (D) All of the above

2. **The rate constant for the reaction is $K = 2.3 \times 10^{-5} L mol^{-1} s^{-1}$. The order of reaction is**
   (A) Zero (B) Fraction (C) One (D) Two

3. **The number of collisions per second per unit volume of the reaction is known as**
   (A) Collision energy
   (B) Activation energy
   (C) Collision frequency
   (D) Kinetic energy

4. **Statement I: Specific conductance decreases with increase in dilution.**
   Statement II: Molar conductance increases with increase in dilution.
   (A) Both Statements I and II are correct
   (B) Statement I is correct and Statement II is incorrect
   (C) Statement I is incorrect and Statement II is correct
   (D) Both Statement I and II are incorrect

5. **Which of the following is a colourless ion**
   (A) V^{+3} (B) Fe^{+3} (C) Ti^{+3} (D) Zn^{+2}

6. **The oxidation state of metal in metal carbonyl complexes is**
   (A) Zero (B) One (C) Two (D) Three

7. **The IUPAC name of complex ion $\left[CoCl_2(en)_2\right]^+$ is**
   (A) Di chloridodiethylene diammine cobalt (III)
   (B) Dichlorido bis(ethane – 1, 2, -diamine) cobalt (III)
   (C) Dichlorido bis(ethane-1,2,-diamine) cobalt (IV)
   (D) Bis (ethane-1,2,-diamine) dichlorido cobalt (III)

8. **The reaction $CH_3Br + AgF \rightarrow CH_3F + AgBr$ is called**
   (A) Swarts reaction
   (B) Wurtz reaction
   (C) Finkelstein reaction
   (D) Gattermann reaction

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9. **A mixture of chloromethane and chlorobenzene are treated with sodium in dry ether, the product obtained is**
(A) Ethane (B) Toluene (C) diphenyl (D) All the above

10. **The high boiling point of ethanol $[C_2H_5OH]$ compared to methoxy methane $[CH_3OCH_3]$ and propane are due to**
(A) Intra molecular hydrogen bonding
(B) Inter molecular hydrogen bonding
(C) Both (A) and (B)
(D) None of these

11. **When phenol is treated with bromine water, a white precipitate of the product obtained is**
(A) 2, - bromo phenol
(B) 4, - bromophenol
(C) Both 2, - bromo phenol and 4, - bromophenol
(D) 2, 4, 6 – tribromophenol

12. **Match the following given in List – I with List – II**

List – I	List – II
(a) Gattermann Koch reaction	(i) $SnCl_2.HCl / H_3O^+$
(b) Stephen reaction	(ii) CrO_2Cl_2 / H_3O^+
(c) Rosenmund reaction	(iii) $CO, HCl / Anhyd.AlCl_3$
(d) Etard reaction	(iv) $H_2 / Pd - BaSO_4$

(A) (a) – (iv), (b) – (iii), (c) – (ii), (d) – (i)
(B) (a) – (iii), (b) – (i), (c) – (iv), (d) – (ii)
(C) (a) – (iii), (b) – (i), (c) – (ii), (d) – (iv)
(D) (a) – (iii), (b) – (ii), (c) – (iv), (d) – (i)

13. **Sodium salts of carboxylic acids are converted into hydrocarbons by**
(A) Dehydrogenation
(B) Dehydrohalogenation
(C) Decarboxylation
(D) Dehydration

14. **Arrange the following in increasing order of basicity**
CH_3NH_2, $(CH_3)_2NH$, $(CH_3)_3N$, $C_6H_5NH_2$
(A) $(CH_3)_3N < (CH_3)_2NH < CH_3NH_2 < C_6H_5NH_2$
(B) $(CH_3)_3N > (CH_3)_2NH > CH_3NH_2 > C_6H_5NH_2$
(C) $C_6H_5NH_2 < (CH_3)_3N < CH_3NH_2 < (CH_3)_2NH$
(D) $C_6H_5NH_2 > (CH_3)_3N > CH_3NH_2 > (CH_3)_2NH$

15. **Which Vitamin deficiency causes the disease Scurvy**
(A) Vitamin – A (B) Vitamin – B_{12} (C) Vitamin – C (D) Vitamin – D

II. **Fill in the blanks choosing the appropriate word from those given in the brackets:** **5 × 1 = 5**

(Electrophilic, lighter flint, Shrinks, Glycine, α -hydrogen, Nucleophillic)

16. When RBC placed in hypertonic solution, the cell wall _____.

17. Misch metal is used to produce _____.

18. Carbonyl Carbon is _____.

19. Aldehydes which do not contain _____ shows Cannizaro reaction.

20. The optically inactive naturally occurring α - aminoacid is _____.

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PART – B

III. **Answer any THREE of the following questions. Each question carries TWO marks:** $3 \times 2 = 6$

21. Aryl halides are less reactive than alkyl halides towards nucelophillic substitution reactions. Give reasons.
22. Write the reactions involved in the manufacture of phenol from Cumene.
23. Give any two differences between ideal and non-ideal solutions.
24. Write the anodic and cathodic reactions in lead – acid battery.
25. What is peptide linkage? How many peptide bonds are present in tripeptides?

PART – C

IV. **Answer any THREE of the following. Each question carries THREE marks:** $3 \times 3 = 9$

26. Write the balanced equations involved in the preparation of potassium dichromate from Chromite ore.
27. What is Lanthanoid contraction? Mention any two consequences of it.
28. Mention any three postulates of Werner's theory of coordination compounds.
29. On the basis of VBT, explain the hybridization, geometry and magnetic property of $[CoF_6]^{3-}$ ion.
30. (a) Explain linkage isomerism with example. [2M]
    (b) Which set of d – orbitals of a metal atom / ion experience more repulsion in octahedral field created by the ligands. [3M]

V. **Answer any TWO of the following. Each question carries THREE marks:** $2 \times 3 = 6$

31. (a) State Raoult's law of relative lowering of vapour pressure. Write its mathematical form. [2M]
    (b) Give one example of solid solution in which the solute is gas. [1M]
32. (a) Write the symbolic representation of SHE and mention the value of $E^0_{H_2}$. [2M]
    (b) State Kohlrausch law of independent migration of ions. [1M]
33. (a) State Faraday's first law of electrolysis. [1M]
    (b) How many Faraday's of electricity are required to reduce one mole of Al^{3+} into Al. [1M]
    (c) Which gas is evolved at cathode during the electrolysis of an aqueous solution of sodium chloride? [1M]
34. Derive the integrated rate equation for first order reaction. [3M]

PART – D

Answer any FOUR of the following. Each question carries FIVE marks: $4 \times 5 = 20$

35. (a) Explain S^1_N mechanism of conversion of tert – butyl bromide to tert - butyl alcohol. [3M]
    (b) What is (i) Asymmetric Carbon (ii) Racemic mixture. [2M]
36. (a) Explain the mechanism of acid catalysed dehydration of ethanol to ethene. [3M]
    (b) Explain Williamson's synthesis of ether with an example. [2M]

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37. (a) Explain Wolf – Kishner reduction for the conversion of Carbonyl group into $-CH_2-$ group. [3M]

(b) How is acetophenone prepared from benzene by Friedel crafts reaction? [2M]

38. (a) How do you prepare carboxylic acid from Grignard reagent? Give an example. [3M]

(b) What is Hell – Volhard – Zelinsky reaction? Give an example. [2M]

39. (a) What is carbyl amine reaction? Write the general equation. [2M]

(b) Give the coupling reaction of benzenediazonium chloride with phenol. Write the equation. [2M]

(c) Give the IUPAC name of $(CH_3)_3N$. [1M]

40. (a) Write the Hawroth structure of Lactose. [2M]

(b) What are essential amino acids? Give an example. [2M]

(c) Name the hormone which regulates blood – sugar level. [1M]

PART – E (Problems)

VI. **Answer any <u>THREE</u> of the following. Each question carries <u>THREE</u> marks:** **3 × 3 = 9**

41. $31g$ of an unknown molecular material is dissolved in $500g$ of water. The resulting solution freezes at $271.14K$. Calculate the molecular mass of the material.

$[Given: K_f \text{ for water} = 1.86\ K\ Kg\ mol^{-1},\ T_f^0 \text{ of water} = 273K]$.

42. Calculate the molality of 20% (W/v) aqueous solution of KI.

Given density of aqueous solution of $KI = 1.2\ g\,cm^{-3}$.

Molar mass of $KI = 166\,g\,mol^{-1}$.

43. The rate of chemical reaction doubles for an increase of temperature from $293K$ to $303K$. Calculate energy of activation of the reaction. $[R = 8.314\,J\,K^{-1}mol^{-1}]$.

44. Show that in a first order reaction, time required for completion of 75% is two times of half life of the reaction $(t_{1/2})$?

45. Calculate Gibb's free energy change for the cell reaction at $298K$.

$3Mg_{(s)} + 2Al^{3+}_{(aq)} \rightarrow 3Mg^{2+}_{(aq)} + 2Al_{(s)}$

$[Given\ E^0_{Mg} = -2.36V,\ E^0_{Al} = -1.66V \text{ and } F = 96487C]$

46. Calculate the equillibrium constant for the reaction

$Cu_{(s)} + 2Ag^+_{(aq)} \rightarrow Cu^{+2} + 2Ag_{(s)}\ [Given: E^0_{cell} = 0.46V]$.

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GD

DISTRICT LEVEL II PUC PREPARATORY EXAM, JANUARY – 2025

Time: 3 Hours **Sub: CHEMISTRY (34)** **Max. Marks: 70**

DISTRICT : DAVANGERE

General Instructions:

1. The question paper has five parts. All parts are compulsory.
   Part – A carries 20 marks, each question carries 1 mark.
   Part – B carries 6 marks, each question carries 2 marks.
   Part – C carries 15 marks, each question carries 3 marks.
   Part – D carries 20 marks, each question carries 5 marks.
   Part – E carries 09 marks, each question carries 3 marks.
2. In Part – A questions, first attempted answer will be considered for avoiding marks.
3. Write balanced chemical equations and draw diagrams wherever necessary.
4. Direct answers to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.
5. Use log table and simple calculators if necessary. (Use of scientific calculator is not allowed).

PART – A

I. **Select the correct option from the given choices:** $15 \times 1 = 15$

1. Which of the following pairs have the same Paramagnetic moment?
   (Atomic numbers: Ti = 22, Mn = 25, Ni = 28, Cu = 29)
   (A) Ti^{3+}, Ni^{2+} (B) Cu^{2+}, Ti^{3+} (C) Ti^{2+}, Cu^{2+} (D) Mn^{2+}, Cu^{2+}

2. p-aminoazobenzene is prepared from benzenediazonium chloride and aniline in
   (A) Acidic medium (B) Basic medium
   (C) Neutral medium (D) Both acidic and basic medium

3. In picric acid
   (A) Three – OH groups are present (B) Two – OH groups are present
   (C) Three – NO_2 groups are present (D) One – NO_2 group is present

4. Chromyl chloride and an aromatic hydrocarbon reacts to produce benzaldehyde. Aromatic hydrocarbon is
   (A) Benzene (B) Toluene (C) Xylene (D) Napthalene

5. The IUPAC name of ethylidene chloride is
   (A) 1–chloroethene (B) 1–chloroethyne
   (C) 1, 2-dichloroethane (D) 1, 1–dichloroethane

6. Which of the following concentration term is dependant on temperature?
   (A) ppm (B) Mole fraction (C) Molarity (D) Molality

7. The radioactive substance reduced to 1/4th of Initial concentration in 20 min, then time to reduce to 1/6th of the initial concentration is
   (A) 60 min (B) 120 min (C) 40 min (D) 15 min

8. The complex $PtCl_2.4NH_3Br_2$ is treated with excess of $AgNO_3$ solution, two mole of $AgBr$ is precipitated. The primary and secondary valence of this complex is
   (A) 6 and 1 (B) 6 and 2 (C) 4 and 6 (D) 3 and 6

9. Which of the following is an ambidentate ligand?
   (A) CO (B) NH_3 (C) SCN^- (D) Cl^-

10. The molecularity of reaction cannot be
    (A) Zero (B) One
    (C) Both (a) and (b) (D) Whole number

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11. Which of the following Halide shows highest reactivity towards S_N^1 reaction
(A) $CH_3 - CH_2 - Cl$ (B) $CH_3 - CH_2 - CH_2 - CH_2I$
(C) C_6H_5Cl (D) $C_6H_5CH_2Cl$

12. The E^0 of Fe^{2+} / Fe, Zn^{2+} and Sn^{2+} / Sn are $-0.44V$, $-0.76V$ and $-0.14V$ respectively. Which metal / metals is / are act as sacrificial electrode to protect iron from rusting?
(A) Both Zn and Sn (B) Zn only (C) Sn only (D) Neither Zn nor Sn

13. The hybridized state of Carbon in Carbonyl group is
(A) sp^2 (B) sp^3 (C) sp (D) dsp^2

14. The correct order of acid strength of the following compound is
(A) Phenol > Cresol > Ethanol (B) Cresol > Phenol > Ethanol
(C) Phenol > Ethanol > Cresol (D) Ethanol > Phenol > Cresol

15. Sulphur containing amino acid is
(A) Cysteine (B) Tryosine (C) Histidine (D) Proline

II. Fill in the blanks by choosing the appropriate word from those given in the brackets: 5 × 1 = 5

(First order, Five, Benzene, Four, HNO_2, Cobalt)

16. Primary aliphatic amines convert into aliphatic alcohols on reacting with _____ solution.
17. Vitamin B_{12} is a coordination compound of _____ metal.
18. Decomposition of N_2O_5 and N_2O are examples of _____ reaction.
19. The spin only magnetic moment of $[MnBr_4]^{-2}$ is $5.9\,B.M$ and its shape is square planar due to the presence of _____ unpaired electrons in the d–orbitals.
20. _____ is formed on heating phenol with Zn dust.

PART – B

III. Answer any THREE of the following questions. Each question carries TWO marks: 3 × 2 = 6

21. How is phenol manufactured by Cumene process? Explain.
22. Explain Swart's reaction with an eample.
23. Write the Haworth's structure of Maltose.
24. Define half – life period of a reaction. Write the relationship between half – life period and initial concentration of first order reaction.
25. State Raoults law of relative lowering of vaporu pressure. Write its mathematical form.

PART – C

IV. Answer any THREE of the following. Each question carries THREE marks: 3 × 3 = 9

26. State any three postulates of Werner theory of coordination compounds.
27. Calculate the spin only magnetic moment of Fe^{+3} ion. (At. No. of Fe = 26).
28. Using the valence bond theory account for the geometry and magnetic nature of $[Co(NH_3)_6]^{+3}$ ion. (Atomic Number of Co = 27).

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29. Define crystal field splitting. Sketch the energy level diagram for the crystal field splitting of d – orbital in a tetrahedral complex.

30. Describe the preparation of potassium dichromate from chromite ore.

V. **Answer any TWO of the following. Each question carries THREE marks:** $2 \times 3 = 6$

31. Derive the integrated rate equation for rate constant of Zero order reaction.

32. Draw a neat, labelled diagram of Standard Hydrogen Electrode (SHE). Write its half cell reaction as cathode and E^0 value.

33. Give the main points of distinction between non-ideal solutions showing positive and negative deviations.

34. What are fuel cells? Write the reactions occurring at anode and cathode in $H_2 - O_2$ fuel cell.

PART – D

V. **Answer any FOUR of the following. Each question carries FIVE marks:** $4 \times 5 = 20$

35. (a) Explain Zaitsev rule with an example. [3M]
    (b) What is chirality? Mention the condition for chirality. [2M]

36. (a) Explain the mechanism of dehydration of ethanol to ethene. [3M]
    (b) Explain Reimer – Tiemann reaction. [2M]

37. (a) Ketones are generally less reactive towards nucleophilic addition reactions. Give any two reasons. [2M]
    (b) Explain Wolff – Kishner reduction with an example. [2M]
    (c) Formaldehyde does not undergo aldol condensation. Give reason. [1M]

38. (a) Give equation to prepare methanamine by Gabriel Phthalmide synthesis. [2M]
    (b) Name the major organic product formed in the following conversion:
        (i) When nitrous acid is treated with methylamine. [1M]
        (ii) Benzene diazonium chloride is treated with KI. [1M]
    (c) Tertiary amines cannot be acylated. Why? [1M]

39. (a) What are reducing sugars? Sucrose is a non-reducing sugar. Give reason. [2M]
    (b) What is a nucleoside? Write any one functions of RNA. [2M]
    (c) Name any one vitamin that is stored in fat storing tissues. [1M]

40. (a) Give the chemical equation for the conversion of propanenitriles into corresponding ketones by using phenyl magnesium bromide. Write the IUPAC name of the product. [3M]
    (b) Explain Hell-Volhard-Zelinsky (HVZ) reaction with an example. [2M]

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PART – E

VI. **Answer any THREE of the following. Each question carries THREE marks:** $3 \times 3 = 9$

41. Calculate the vapour pressure of a mixture contalning $50g$ of liquid A (molar mass $100\,g\,mol^{-1}$ and $75g$ of liquid B (Molar mass $200\,g\,mol^{-1}$). Given vapour pressure of liquid A is $250\ mm\ of\ Hg$ and liquid B is $150\ mm\ of\ Hg$ respectively.

42. Show that in a first order reaction, time required for completion of 99.9% is 10 times of half – life $(t_{1/2})$ of the reaction.

43. The standard electrode potential of Daniel cell is $1.1V$. Calculate the standard Gibb's energy for the reaction:
$Zn_{(s)} + Cu^{2+}_{(aq)} \rightarrow Zn^{2+}_{(aq)} + Cu_{(s)}$. $(Given: F = 96487\ C/mol)$.

44. Calculate the molarity of 20% (w/v) aqueous solution of KI. Given density of aqueous solution of $KI = 1.2\ g\,cm^{-3}$. Molar mass of $KI = 166\,g\,mol^{-1}$.

45. The electrical resistance of a column of $0.05\ mol\,L^{-1}\ NaOH$ solution of diameter $1cm$ and length $50cm$ is $5.55 \times 10^3 \Omega$. Calculate its resistivity, conductivity and molar conductivity.

46. A reaction is first order in A and second order in B
    (i) Write the differential rate equation.
    (ii) How is the rate affected on increasing the concentration of 'B" three times and decreasing the concentration of 'A' by two times?
    (iii) How is the rate affected when the concentrations of both 'A' and 'B' are tripled?

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Collection Of Question Papers For POCKET MARKS 70/70

PREPARATORY EXAMINATION - JANUARY 2025

Time : 3-00 Hrs. | II PUC - Chemistry (34) | Max. Marks : 70

DISTRICT : DAKSHINA KANNADA

Instructions:

1. Question paper has FIVE parts. All parts are compulsory.
2. a. Part A carries 20 marks. Each question carries 1 mark.
   b. Part B carries 06 marks. Each question carries 2 marks.
   c. Part C carries 15 marks. Each question carries 3 marks.
   d. Part D carries 20 marks. Each question carries 5 marks.
   e. Part E carries 09 marks. Each question carries 3 marks.
3. In part A questions first attempted answer will be considered for awarding marks.
4. Write balanced chemical equations and draw neat labelled diagrams and graphs wherever necessary.
5. Direct answer to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.
6. Use log tables and simple calculator if necessary (Use of scientific calculator is not allowed).

PART - A

I Select the correct option from the given choices 15 X 1 = 15

1. When one Faraday current is passed, which of the following would deposit one gram atomic mass of the metal?
   a) NaCl b) $ZnSO_4$ c) $AlCl_3$ d) $BaCl_2$
2. Which of the following ions has the least magnetic moment?
   a) Cu^{2+} b) Co^{3+} c) Ni^{2+} d) Fe^{2+}
3. Which of the following is the correct increasing order of strength in spectrochemical series of ligands?
   a) $EDTA^{-4} < C_2O_4^{-2} < Cl^- < OH^- < CN^-$ b) $EDTA^{-4} < C_2O_4^{-2} < CN^- < OH^- < Cl^-$
   c) $Cl^- < C_2O_4^{-2} < Cl^- < OH^- < EDTA^{-4}$ d) $Cl^- < OH^- < C_2O_4^{-2} < EDTA^{-4} < CN^-$
4. When a substance is dissolved in a solvent, the vapour pressure for the solvent is decreased. This results in
   a) The solution having a lower osmotic pressure than the solvent
   b) A decrease in the boiling point of solvent
   c) The solution having a higher freezing point than the solvent
   d) An increase in the boiling point of the solution
5. A compound **X** with molecular formula C_2H_4 reacts with HBr to give compound **Y**, which on further reacts with NaI in dry acetone to give compound **Z**. Identify compound **Z**
   a) C_2H_5I b) C_2H_5Br c) C_2H_6 d) C_2H_5F
6. The time required for 100 percent completion of a zero order reaction is
   a) $\frac{2k}{[R]_0}$ b) $\frac{[R]_0}{2k}$ c) $\frac{[R]_0}{k}$ d) $[R]_0 k$
7. An organic compound 'A' containing C, H and O has a pleasant odour with boiling point of 78°C. On boiling 'A' with conc. H_2SO_4, a colourless gas is produced which decolourises bromine water and alkaline $KMnO_4$. The organic compound A is
   a) C_2H_5Cl b) C_2H_5OH c) $C_2H_5COOCH_3$ d) C_6H_6
8. Phenyl methyl ketone can be converted into ethyl benzene in one step by which of the following reagents?
   a) $LiAlH_4$ b) Zn – Hg/ HCl c) $NaBH_4$ d) CH_3MgI
9. If R is methyl group, then which order of basicity is correct in aqueous state ;
   a) $RNH_2 > NH_3 > R_2NH > R_3N$ b) $R_2NH > RNH_2 > R_3N > NH_3$
   c) $R_3N > R_2NH > RNH_2 > NH_3$ d) $NH_3 > RNH_2 > R_2NH > R_3N$

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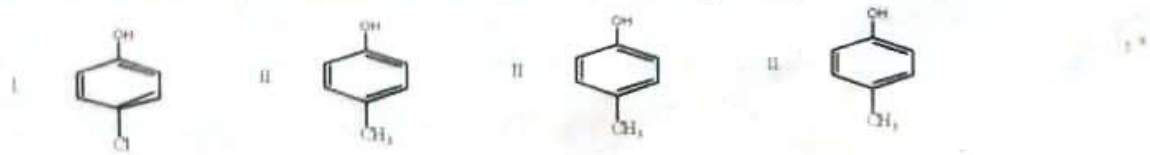
10. **Statement I:** Catalyst does not alter the Gibbs energy
Statement II: Catalyst catalyses the forward as well as the backward reactions to the same extent
a) Statement I is correct
b) Statement II is correct
c) Statement I and Statement II both are correct
d) Statement I and Statement II both are incorrect

11. Estradiol is responsible for the development of
a) primary female characters b) Secondary female characters
c) secondary male characters d) primary male characters

12. An organic compound with the molecular formula $C_9H_{10}O$ forms 2,4-DNP derivative, reduces Tollens' reagent and undergoes Cannizzaro reaction. On vigorous oxidation, it gives 1,2-benzenedicarboxylic acid. The compound is
a) 3-ethyl benzaldehyde b) 2-ethyl benzaldehyde
c) 4-ethyl benzaldehyde d) 2, 3-dimethyl benzaldehyde

13. Arrange the following compounds in the order of decreasing acidity;



a) IV > III > I > II b) II > IV > I > III c) I > II > III > IV d) III > I > II > IV

14. The complexes $[Co(NH_3)_6][Cr(CN)_6]$ and $[Cr(NH_3)_6][Co(CN)_6]$ are the examples of which type of isomerism?
a) Geometrical isomerism b) Ionizaiton isomerism
c) Co- ordination isomerism d) Linkage isomerism

15. Match the following given in column I with column II and choose the correct option from the choices given below;

Column I	Column II
A) Benzene sulphonyl chloride	i) Zwitter ion
B) Sulphanilic acid	ii) Hinsberg's reagent
C) Quaternary ammonium salts	iii) Dyes
D) Aryl diazonium salts	iv) Surfactants

a) A-ii, B-iii, C-iv, D-i b) A-ii, B-i, C-iv, D-iii c) A-iii B-i, C-iv, D-ii d) A-i, B-ii, C-iv, D-iii

II Fill in the blanks by choosing the appropriate word from those given in the bracket: **5 X 1 = 05**
(glucose, diethyl ether, hydrocarbon, cerium, molecularity, unimolecular)

16. Grignard reagent react with any source of proton to give ----------
17. The reaction in which only one reacting species involved is called----------
18. A member of the lanthanoid series which is well known to exhibit +4 oxidation state is ----------
19. ---------- has been used as an inhalation anaesthetic.
20. On prolonged heating with HI, ---------- forms n-hexane.

PART - B

III Answer any Three of the following. Each question carries two marks, questions. **3X2 = 06**

21. Give any two important properties of non- ideal solutions.
22. a) What is the cause for lanthanoid contraction?
b) Study of actinoid elements is difficult. Give a reason.
23. How can chlorobenzene be converted into diphenyl? Name the reaction.
24. Write the Haworth structure of Lactose.
25. How do you prepare t-butyl methyl ether by Williamson synthesis? Write the chemical equation.

PART - C

IV Answer any Three of the following. Each question carries three marks. **3X3 =09**

26. Using Valence Bond Theory [VBT], explain geometry, hybridisation and magnetic property of $[Ni(CN)_4]^{2-}$ ion. [Atomic number of Nickel is 28].

27. a) Based on crystal field theory, write the electronic configuration for metal ion with d^4 electron system, when
i) $\Delta_0 < P$ ii) $\Delta_0 > P$.
b) Write the IUPAC name of the compound $[Cr(NH_3)_3(H_2O)_3]Cl_3$

28. a) Write any two differences of primary and secondary valencies of a central metal atom or ion.
b) Give any one limitation of crystal field theory.

29. a) The transition metals form a large number of complex compounds. Give reasons. 2
b) What are interstitial compounds? 1

30. Write the balanced chemical equations for the reactions involved in preparation of potassium dichromate from chromite ore.

V Answer any Two of the following. Each question carries three marks. **2X3 =06**

31. a) Explain desalination of sea water by reverse osmosis with neat labelled diagram.
b) What is the value of van't Hoff factor for weak acid which undergoes association in aqueous solution?

32. Draw a neat labelled diagram of H_2-O_2 fuel cell. Write the reaction occurs at anode of the cell and name a catalyst used in the electrodes.

33. (a) $Zn_{(s)} + 2Ag^+_{(aq)} \rightarrow Zn^{2+}_{(aq)} + 2\,Ag_{(s)}$
For the above cell reaction
(i) Write the cell representation
(ii) Predict the carriers of the current in the cell 2
(b) State Faraday's first law of electrolysis. 1

34. Define half - life period of a reaction. Show that half- life period of first order reaction is independent on initial concentration of reactant.

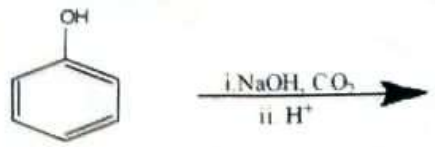
PART - D

VI Answer any Four of the following. Each question carries five marks. **4X5 = 20**

35. a) Write the steps involved in mechanism of conversion of 2-Bromo-2-methyl propane into 2-Methylpropan-2-ol 2
b) With the help of chemical reaction show that presence of electron withdrawing group fastens nucleophilic substitution reactions of haloarenes. 2
c) Define chirality. 1

36. a) Write the reaction mechanism involved in the acid catalyzed dehydration of C_2H_5OH to C_2H_4. 3
b) Complete the following reaction and name the reaction 2

37.





Identify A, B, and C in the above reaction. 3
b) Explain the conversion of ethanoic acid into ethanoic anhydride 2

38. a) Mention any two differences between amylose and amylopectin 2

b) i) Water soluble vitamins must be supplied regularly in diet. Give reason. 1

ii) What is denaturation of proteins? 1

c) Which is the nitrogen containing heterocyclic compound (base) forms hydrogen bond with thymine in DNA? 1

39. a) Give the preparation of p-Aminoazobenzene. 2

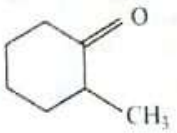
b) An organic compound P with molecular formula C_6H_7N is treated with acetic anhydride in the presence of pyridine gives compound Q. The compound Q undergoes bromination with bromine in acetic acid gives substituted amide R. The compound R on acid hydrolysis yields a substituted amine S. Write all the reactions involved. 3

40. a) Explain the preparation of ethanal by Stephen reaction. 2

b) Write the equations for:

i) Gattermann – Koch reaction to convert benzene into benzaldehyde 1

ii) the reaction between propanone with hydrazine 1

c) Write the IUPAC name of  1

PART – E

(NUMERICAL PROBLEMS)

VII Answer any Three of the following. Each question carries four marks. **3X3 = 09**

41. Henry's law constant for CO_2 in water is 1.67×10^8 Pa at 298K. Calculate the mass of CO_2 dissolved in 250 mL of soda water when packed under 2.5 atm CO_2 pressure at 298K.

42. 45 gram ethylene glycol (molar mass 62 g mol^{-1}) is mixed with 500g of water. Calculate the freezing point depression. Given K_f for water is 1.86 K kg mol^{-1}.

43. The rate constant for the decomposition of hydrocarbons is 2.418×10^{-5} s^{-1} at 546K. If the energy of activation is 179.9 kJ mol^{-1}, what will be the value of pre- exponential factor?

44. The molar conductivity of 0.001028 mol L^{-1} acetic acid is 48.15 S cm^2 mol^{-1}. If Λ^0_m for acetic acid is 390.5 S cm^2 mol^{-1}. Calculate its dissociation constant?

45. The following data were obtained during the first order thermal decomposition of $N_2O_{5(g)}$ at constant volume;

$2\ N_2O_{5(g)} \rightarrow 2\ N_2O_{4(g)} + O_{2(g)}$

S. No.	Time / s	Total pressure /atm
1.	0	0.5
2.	100	0.512

Calculate the rate constant.

46. Calculate the emf of the following cell at 298K

$Sn_{(s)}|Sn^{2+}$ (0.05M)$||H^+$(0.03M)$|$ H_2 (g) (1bar) $|$ $Pt_{(s)}$ $\quad E^0_{Sn^{2+}/Sn} = -0.14V$.

II PUC PREPARATORY EXAMINATION 2024 - 2025

CHEMISTRY (34)

Time 3-00 Hours **Max Marks 70**

DISTRICT : DHARWAD

Instructions : 1) Question paper has FIVE parts. All parts are compulsory.
2) a) Part-A carries 20 marks. Each question carries 1 mark.
b) Part-B carries 06 marks. Each question carries 2 marks.
c) Part-C carries 15 marks. Each question carries 3 marks.
d) Part-D carries 20marks. Each question carries 5 marks.
e) Part-E carries 09 marks. Each question carries 3 marks.
3) In Part-A questions, first attempted answer will be considered for awarding marks.
4) Write balanced chemical equations and draw neat labeled diagrams and graphs wherever necessary.
5) Direct answers to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.
6) Use log tables and simple calculator if necessary (use of scientific calculator is not allowed).
7) For a question having circuit diagram/figure/ graph/ diagram, alternate questions are given at the end of question paper in a separate section for visually challenged students.

PART-A

I) Select the correct option from the given choices. **15 x 1 = 15**

1) Among the following statements which statement is correct about metal carbonyls?
a) Metal carbonyls are s - bonded organometallic compounds
b) Metal carbonyls are p - bonded organometallic compounds
c) Metal carbonyls involve both s and p bonds between metal and oxygen of carbonyl group
d) Metal carbonyls involve both s and p bonds between metal and carbon of carbonyl group

2) Acid hydrolysis of ethyl acetate is an example for
a) Zero order reaction
b) First order reaction
c) Second order reaction
d) Pseudo first order reaction

3) Statement I : In case of anisole, methylphenyloxonium ion is formed by protonation of ether.
Statement II : The bond between O–CH_3 is stronger than the bond between O–C_6H_5.
Identify the correct statement
a) Both statement I and II are correct.
b) Both statement I and II are incorrect.
c) Statement I is correct and statement II is incorrect.
d) Statement I is incorrect and statement II is correct.

4) Pick out the ideal solution among the following.
a) Phenol and Aniline
b) Ethanol and Acetone
c) Chloroform and Acetone
d) n-hexane and n-heptane

5) In vinylic halides, the halogen atom is attached to carbon atom.
a) sp^3 b) sp^2 c) sp d) dsp^2

6) An electrochemical cell can behave like an electrolytic cell when,
a) $E_{cell} = 0$ b) $E_{cell} > E_{ext}$ c) $E_{cell} < E_{ext}$ d) $E_{cell} = E_{ext}$

7) Ketones react with hydroxylamine to form
a) Imine b) semicarbazone c) oxime c) hydrozone

8) Which of the following is a vitamin?
a) Aspartic acid b) Ascorbic acid c) Adipic acid d) Saccharic acid

9) The decreasing order of boiling points of ethanol, propane and dimethyl ether are ;
a) ethanol > dimethyl ether > propane
b) ethanol > propane > dimethyl ether
c) propane > dimethyl ether > ethanol
d) propane > ethanol > dimethyl ether

10) In a reaction A + B → products, rate is doubled when the concentration of B is doubled and rate increases by a factor of 8 when the concentrations of both the reactants (A and B) are doubled, rate law for the reaction can be written as

a) Rate = K [A][B]^2 b) Rate = K [A]^2[B]^2 c) Rate = K [A]^2[B] d) Rate = K [A][B]

11) Decarboxylating reagent is

a) NaOH b) NaOH+CaO c) A/c·KOH d) Zinc dust

12) In aqueous solution copper (I) ions undergo.

a) oxidation b) reduction c) disproportionation d) redox reaction

13) Match the following given in Column I with Column II

Column-I	Column-II
i) Methane to Ethane	A) Finkelstein reaction
ii) Chloromethane to Iodomethane	B) Fittig reaction
iii) Bromomethane to Fluromethane	C) Wurtz reaction
iv) Benzene to diphenyl	D) Swarts reaction

a) i-C, ii-B, iii-A, iv-D b) i-C, ii-A, iii-D, iv-B

c) i-B, ii-C, iii-D, iv-A d) i-D, ii-C, iii-B, iv-A

14) In the coupling reaction of $C_6H_5N^+{}_2Cl^-$ with C_6H_5OH, the coupling takes place at

a) Meta pasition of C_6H_5OH b) Ortho position of $C_6H_5N^+{}_2Cl^-$

c) Para position of C_6H_5OH d) Meta position of $C_6H_5N^+{}_2Cl^-$

15) In IUPAC name of ionisation isomer of $[Co(NH_3)_5\ SO_4]Br$

a) penta-ammine sulphato cobalt (III) bromide

b) penta-ammine bromido cobalt (III) sulphate

c) penta-ammine sulphato cobalt (II) sulphate

d) penta-ammine bromido sulphato cobaltate (III)

II) Fill in the blanks by choosing the appropriate word from those given in the brackets:
(Glucose, Ethanol, Glycogen, Methanol, Activation energy of reaction, ΔG^o) **5 x 1 = 05**

16) _____ is known as animal starch.

17) Cellulose is polymer of _____.

18) Ethyl amine when treated with nitrous acid gives _____.

19) The chemical name of wood spirit is _____.

20) The role of catalyst is to change _____.

PART-B

III) Answer ANY THREE of the following. Each question carries two marks. **3 x 2 = 06**

21) Draw the graph to show non-ideal solutions with positive deviation from ideal behavior.

22) An organic compound with molecular formula C_6H_6O gives white ppt with Br_2 water. Identify the organic compound write the chemical equation for the reaction.

23) Explain ionisation isomerism with an example.

24) Identify A and B in the following equation.

$$A + Mg \xrightarrow{\text{dry ether}} B \xrightarrow{+H_2O} C_2H_6 + Mg(OH)Br$$

25) What is denaturation of proteiens? Which level of structure remains intact during denaturation of globular proteins?

PART-C

IV) Answer ANY THREE of the following. Each question carries three marks. **3 x 3 = 09**

26) When an oxide of manganese (A) is fused with KOH in the presence of an oxidising agent and dissolved in water. It gives a dark green solution of compound (B). compound (B) disproportionates in neutral or

acidic solution to give purple compound (C). An alkaline solution of compound (C) oxidises potassium iodide solution to a compound (D) and compound (A) is also formed. Identify compounds A to D and write the reaction involved.

27) Explain crystal field splitting in tetrahedral complexes.

28) Write any three limitations of valence bond theory of co-ordination compounds.

29) Name the following.

i) The element of the first transition series has highest second ionisation enthalpy.

ii) The element of the first transition series shows highest number of oxidation states.

iii) The element of the first transition series has lowest enthalpy of atomisation.

30) What is lanthanoid contraction? Explain the cause for it and one of its consequence.

V) Answer ANY TWO of the following. Each question carries three marks. **2 x 3 = 06**

31) Show that half-life period for a first order reaction is independent of the initial concentration.

32) a) Write the anodic and cathodic reactions of H_2-O_2 cell.

b) What is the role of finely powdered platinum used in the above cell.

33) a) Write two factors on which the products of electrolysis depends.

b) During the electrolysis of aqueous NaCl, which gas is liberated at cathode?

34) Write 3 differences between solutions showing positive deviation and negative deviation from Raoult's law.

PART-D

VI) Answer ANY FOUR of the following. Each question carries five marks. **4 x 5 = 20**

35) a) Write the mechanism for the addition of HCN to carbonyl compound in the presence of base.

b) Aromatic carboxylic acid does not undergo Friedel-Crafts reaction. Give reason. **(3+2)**

36) a) Write the Haworth's structure of β-D(+) glucopyranose.

b) What are nucleotides and nucleosides?

c) Deficiency of which vitamin causes the disease pernicious anaemia? **(2+2+1)**

37) a) Explain the preparation of benzylamine by Hoffmann bromamide reaction. Write the chemical reaction.

b) Give the equation for the conversion of aniline to 4-bromoaniline.

c) Between aqueous solution of aniline and ammonia which is more basic? **(2+2+1)**

38) a) How is phenol prepared from aniline? Write the equation.

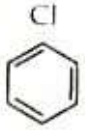
b) How do you prepare methoxy ethane by Williamson's ether synthesis?

c) $RCOOH \rightarrow RCH_2OH$. Name the reagent used in the given conversion. **(2+2+1)**

39) a) Explain Wurtz-Fittig reaction with an example.

b) Complete the following reactions.

i) $H_2C = CH_2 + Br_2 \xrightarrow{CCl_4} ?$

ii)  $\xrightarrow[\text{ii) } H^{\oplus}]{\text{i) NaOH, 623K, 300atm}} ?$

iii) 2-bromopentane $\xrightarrow[\text{A/c . KOH}]{\Delta} ?$ **(2+3)**

40) a) In the reaction

$$A \xrightarrow[\text{Anhydr; } AlCl_3 \text{ CuCl}]{\text{CO, HCl}} B + NaOH + \xrightarrow[\text{(Conc)}]{} C + D$$

Identify A, B, C and D.

b) What is the effect of electron withdrawing group on acidity of carboxylic acids. (4+1)

PART–E
(NUMERICAL PROBLEMS)

VII) Answer ANY THREE of the following. Each question carries three marks. 3 x 3 = 09

41) The decomposition of hydrocarbon follows the equation $K=(4.5\times10^{11}S^{-1})e^{-28000K/T}$. Calculate Ea.

42) The half-life for radiaactive decay of ^{14}C is 5730 years. An archaeological artifact containing wood had only 80% of the ^{14}C found in a living tree. Estimate the age of the sample.

43) The molar conductivity of 0.025 $molL^{-1}$ methanoic acid is 46.1 Scm^2mol^{-1}. Calculate its degree of dissociation and dissociation constant.
(Given : $\lambda°(H^+) = 349.6\ Scm^2mol^{-1}$. $\lambda°(HCOO^-) = 54.6\ Scm^2mol^{-1}$)

44) Calculate EMF of the cell represented below.

$$Zn/Zn^{2+}_{(C=0.1M)} \parallel Cu^{2+}_{(C=1M)} \mid Cu \text{ at } 25°C. \text{ Given } E^0_{Cu} = 0.34V$$

$$E^0_{Zn} = -0.76V$$

45) Determine the osmotic pressure of a solution prepared by dissolving 25 mg of K_2SO_4 in 2 litre of water at 25°C assuming that it is completely dissociated.

46) 5.8g of non-volatile solute was dissolved in 100g of carbon disulphide. The vapour pressure of the solution was found to be 190 mm of Hg. Calculate the molar mass of the solute. Given the vapour pressure of pure carbon disulphide is 195 mm of Hg. (Molar mass of carbon disulphide = 76 $gmol^{-1}$)

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KT 34

Deputy Director, Department of School Education (Pre – University)
District Pre – University College's Principal Association(R)
PUC– II Year Preparatory Examination January - 2025

Time : 3 Hrs | **Sub : Chemistry (34)** | Max Marks : 70

DISTRICT : GADAG

INSTRUCTIONS:-

1. Question paper has FIVE Parts, All parts are compulsory.
2. a) PART – A carries 20 marks. Each carries 1 mark.
   b) PART – B carries 06 marks. Each questions carries 2 – marks.
   c) PART – C carries 15 marks. Each questions carries 3 – marks.
   d) PART – D carries 20 marks. Each question carries 5 – marks
   e) PART – E carries 09 marks. Each question carries 3 – marks.
3. In PART – A questions first tempered answer will be considered for awarding marks.
4. Write balanced chemical equations and draw neat labelled diagrams and graphs wherever necessary.
5. Direct answer to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.
6. Use log tables and simple calculator if necessary case of scientific calculator is not allowed.
7. For a question having circuit diagram / figure / graph / diagram. Alternate questions are given at the end of question paper in a separate section for visually challenged students.

PART – A

1. Select the correct option from the given choices 15 x 1 = 15

1. The pressure cooker reduces the cooking timing because
   a) Heat is more evenly distributed
   b) The boiling point of water inside the cooker is elevated
   c) The boiling point of water inside the cooker is depressed
   d) Higher pressure inside the cooker tenderises food.

2. 68% of nitric acid in water
   a) Has zero enthalpy of mixing
   b) Cannot be separated by distillation
   c) Follows Raoult's Law
   d) Has zero volume change of mixing

3. The solubility of solid does not depend on
   a) Nature of the solute
   b) Nature of the solvent
   c) Pressure
   d) Temperature

4. In presence of a catalyst, the heat evolved or absorbed during the reaction
   a) Increases
   b) Decreases
   c) Depends on the reaction
   d) Remains unchanged.

5. The characteristic feature of transition metal is
   a) They show variable oxidation state
   b) They do not form complexes
   c) They are not good catalyst
   d) They exhibit only diamagnetism

6. Which of the following ligand produces synergic effect in coordination complexes
   a) Oxalates b) Carbon Monoxide c) Sulphate d) Nitrates

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7. According to warner's theory, the primary valencies of the central atom
   a) Satisfied by negative ion or neutral molecules
   b) Satisfied by negative ions
   c) Are equal to co - ordination number
   d) Decide the geometry of the complex

8. $R - X + NaI \xrightarrow{dry\ acetone} RI + HX$ name the reaction
   a) Wurtz reaction
   b) Fittig reaction
   c) Swartz reaction
   d) Finkelstein reaction

9. **Assertion:** SN^2 reactions do not proceed with retention.
   Reason: SN^2 reaction proceeds in single steps.
   a) If both assertion and reason are correct and reason is correct explanation for assertion
   b) If both assertion and reason are correct but reason is not correct explanation for assertion
   c) If assertion is correct but reason is incorrect
   d) If both assertion and reason are in correct

10. By product obtained during preparation of phenol from cumene is
    a) Ketone b) Aldelyde c) Alcohol d) Cresol

11. Which is a simple ether
    a) $C_2H_5OCH_3$ b) CH_3OCH_3 c) $C_6H_5OCH_3$ d) None of thes

12. Which of the following will not undergo Cannizzaro's reaction
    a) CH_3CHO b) $(CH_3)_3CCHO$ c) HCHO d) C_6H_5CHO

13. Which of the following has more basic strength in aqueous medium
    a) $(C_2H_5)_3N$ b) NH_3 c) $C_2H_5NH_2$ d) $(C_2H_5)_2NH$

14. Match the following

List - I	List - II
A. Vitamin - B12	i) Mg
B. Glucose	ii) Ni
C. Chlorophyll	iii) Fe
D. Haemoglobin	iv) Co
	v) None

    a) A - iv, B - v, C - i, D - iii
    b) A - v. B - i. C - iii, D - iv
    c) A - iii, B - ii, C - iv, D - i
    d) A - iv, B - v, C - ii, D - iii

15. Which base is not present in DNA
    a) Uracil b) Cyatocine c) Thymine d) Adenine

II. Fill in the blanks by choosing the appropriate word from those given in the bracket 5 x 1 = 05

[NaOH + CaO, $KMnO_4$, SP^3, SP^2, Copper in gold, $C_6H_5SO_2Cl$]

16. Example for solid solution_____

17. Purple coloured strong oxidising agent_____

18. In phenols - OH group is attached to _____ hybridised carbon atom

19. Decarboxyating agent is _____

20. _____ is known as Hinsberg' s reagent

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PART - B

III. Answer any THREE of the following. Each questions carries two marks **3 x 2 = 06**

21. Write any 2 - differences between molecularity and order of the reaction.
22. Although copper and Zinc has completely filled d - orbitals in their ground state, How you can say copper is a transition metal and zinc is not?
23. Explain the preparation of arylhalide by sandmeyers's reaction.
24. How do you prepare phenol from isopropylbenzene. Explain with equation.
25. Write Haworth structure of Lactose.

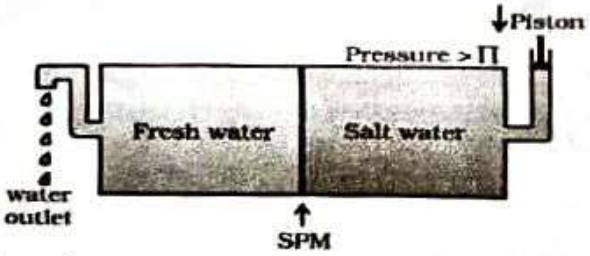
PART - C

IV. Answer any THREE of the following. Each question carries three marks **3 x 3 = 09**

26. Write the balanced chemical equations involved in manufacturing of potassium dichromate by chromite ore.
27. Although +3 is the common oxidation state of Lanthanoids, Cerium (III) easily oxidises cerium (IV). Explain with electronic configuration. (Ce At . No - 58)
28. Keerthi prepares cobalt complex $[Co(NH_3)_5ONO]Cl_2$
    a) Write its IUPAC name
    b) What is its Linkage isomer
    c) What is its primary valency
29. Octahedral complex $[Fe(CN)_6]^{4-}$ has strong field Ligand(CN^-). Explain the crystal field splitting and electronic configuration of Fe in the complex based on CFT. (with diagram)
30. Explain the hybridisation, geometry and magnetic property of $[Ni(CN)_4]^{2-}$ complex based on VBT.

V. Answer any TWO of the following. Each question carries three marks **2 x 3 = 06**

31.



a) Name the process occurring in above plant
b) To which container does water flow
c) Give one practical use of the container **(1 + 1 + 1)**

32. On dilution the molar conductivity of CH_3COOH increase drastically. Explain with the help of diagram.
33. a) What is the advantage of secondary battery over primary battery?
    b) Write cathodic and anodic reactions of lead storage battery **(1 + 2)**
34. Derive the equation for rate constant of first order reaction.

PART - D

VI. Answer any FOUR of the following. Each question carries five marks **4 x 5 = 20**

35. a) Explain the mechanism of S_{N1} reaction involved in the conversion of tertiary butyl bromide into tertiary butyl alcohol.

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b) Explain. Why haloarens are less reactive towards nucleophilic substitution reaction. (3 + 2)

36. a) Explain the mechanism of conversion of alkene to alcohol by hydration
b) Explain nitration of anisole with equation (3 + 2)

37. a) Explain the cross aldol condensation between acetaldehyde and Propanaldehyde
b) Explain Wolf – Kishner reduction with equation (3 + 2)

38. a) Explain the reaction for the preparation of aldehyde from nitriles using Stannous Chloride in HCL & name the reaction

b) *Identify A and B*

$$C_6H_5COOH \xrightarrow{SoCl_2} A \xrightarrow{\text{Rosenmund reduction}} B$$

39. a) Explain carbylamines test with reaction equation. What is the observation during this reaction?
b) What is coupling reaction? Explain with equation (3 + 2)

40. Name the following: -
a) Water soluble starch components.
b) Fibrous protein.
c) Fat soluble vitamin.
d) Bond connecting amino acids in protein.
e) The unit attached with base in nucleoside (1 + 1 + 1 + 1 + 1)

PART – E (NUMERICAL PROBLEMS)

VII. Answer any THREE of the following. Each questions carries three marks 3 x 3 = 09

41. 1.46 % solution of a compound has an osmotic pressure of 783 mm of Hg at 300 k. calculate the molar mass of the component [R = 62. 36 L mm of Hg $K^{-1}mol^{-1}$]

42. 2 g of urea [$M_B = 60g/mol$] when dissolved in 200g of a centain solvent decreases the freezing point by 0.2° c. 3.2 g of an unknown substance when dissolved in 160 g of same solvent, depression of freezing point by 0.36° *c*. Calculate the molar mas of unknown substance.

43. The molar conductance of sodium chloride, hydrochloric acid and sodium acetate at infinite dilution are 126.45, 426.16 and 19. 0 $Ohm^{-1}Cm^2mol^{-1}$ respectively at 25° *C. Calculate* the molar conductance of acetic acid at infinite dilution.

44. Calculate the value of equilibrium constant for the reaction taking place between Cu^{2+} ion and Sn^{2+} ion in aqueous solution at 298 k
[Given $E^0Cu^{2+}/Cu = 0.34$ v, $E^0Sn^{2+}/Sn^{4+} = -0.154$ v]

45. The rate of reaction doubles when the temperature changes from 300 k to 310 k. Calculate the activation energy of the reaction [Given R = 8. 314 $JK^{-1}Mol^{-1}$]

46. Find out 2/3 life of a first order reaction in which K = 5.48 x $10^{-14}s^{-1}$

PART – F
(For Visually challenged students only)

31. a) what is reverse osmosis. Give its one application.
b) Which membrane is used in reverse osmosis (2 + 1)

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PREPARATORY EXAMINATION; JANUARY— 2025

Subject: CHEMISTRY(34)

Time: 3.00 Hours **Maximum Marks: 70**

Instructions:

DISTRICT : HASSANA

1. The question paper has FIVE parts–A,B,C,D and E. All parts are compulsory.
2. Part–A carries 20 marks , Each question carries 1 mark
   Part–B carries 06 marks , Each question carries 2 marks
   Part–C carries 15 marks , Each question carries 3 marks
   Part–D carries 20 marks , Each question carries 5 marks
   Part–E carries 09 marks , Each question carries 3 marks.
3. In Part–A questions, first attempted answer will be considered for awarding marks.
4. Write balanced equations and draw neat labeled diagrams & graphs wherever necessary.
5. Direct answers to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.
6. Use Log tables and simple calculators if necessary (Use of scientific calculator is not allowed).

PART—A

I. Select the correct option from the given choices: **1X15=15**

1. The dissolution of a gas in a liquid is governed by
   a) Roult's law b) Henry's law
   c) Dalton's law of Pressure d) Boyle's law

2. Assuming complete dissociation, the value of van't Hoff factor for Na_2SO_4 is
   a) 1 b) 2 c) 3 d) 4

3. The product formed at anode during the electrolysis of aqueous NaCl is
   a) H_2 b) O_2 c) Na d) Cl_2

4. What is the value of 'x' if total order of the reaction which has the rate expression : Rate = k $[A]^x [B]^{2x}$ is 3/2
   a) ½ b) 3/2 c) 4 d) 2

5. The primary and secondary valencies of Iron in the complex $[Fe(C_2O_4)_3]^{3-}$ are
   a) 3 and 3 b) 6 and 6
   c) 3 and 6 d) 6 and 3

6. The complex $[Pt(NH_3)_2Cl_2]$ exhibits
   a) Linkage isomerism b) fac–mer isomerism
   c) Ionization isomerism d) cis–trans isomerism

7. The compound $H_2C{=}CH{-}Cl$ is an example for
   a) Allylic halides b) Aryl halides
   c) Benzylic halides d) Vinylic halides

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8. Which of the following contains Chiral carbon atom

a) 1-Chloroethane
b) 1,2-Dichloroethane
c) 1,1-Dichloroethane
d) 1-Bromo-1-Chloroethane

9. When an alcohol is treated with Lucas reagent, if immediate turbidity appears, then it confirms the presence of

a) Primary alcohol
b) Secondary alcohol
c) Tertiary alcohol
d) All of these

10. When Phenol is heated with Zn dust it gives

a) Benzyl alcohol
b) Ethanol
c) Methanol
d) Benzene

11. Which of the following aldehyde is present in formalin → solution of formaldehyde in H_2O

a) Methanal
b) Ethanal
c) Propanal
d) Benzaldehyde

12. When CH_3CH_2COOH is treated with $NaHCO_3$, a gas is liberated which turns lime water milky. The liberated gas is

a) H_2 b) CO c) CO_2 d) O_2

13. The IUPAC name of compound $CH_3–NH–CH_2–CH_3$ is

a) 2–Methylethanamine
b) 2–Ethylmethanamine
c) N–Methylethanamine
d) N–Ethylmethanamine

14. Which of the following decides the basic strength of alkyl amines in the aqueous state

a) Inductive effect
b) Solvation effect
c) Steric hinderance of alky groups
d) All of these

15. The base which is not found in RNA is

a) Adenine
b) Guanine
c) Thymine
d) Cytosine

II. Fill in the blanks by choosing the appropriate word from those given in the brackets: **1X5=5**

[Mischmetall, Diethyl ether, Scurvy, Ambidentate, Azeotropes, Gun metal]

16. The binary mixtures having the same composition in liquid and vapour phase and boil at a constant temperature are called _____.

17. _____ is an alloy which consists of lanthanoid metal (~95%) and iron (~5%).

18. Linkage isomerism arises in a coordination compound containing_____ ligand.

19. The major product obtained when ethanol is heated with conc.H_2SO_4 at 413K is_____.

20. Deficiency of which Vitamin C causes _____.

PART—B

III. Answer any THREE of the following. Each question carries two marks: 2X3=6

21. Graphically represent the effect of catalyst on activation energy.

22. Give the IUPAC names of the complexes :

i) $[Cr(NH_3)_3(H_2O)_3]Cl_3$ ii) $K_2[Zn(OH)_4]$

23. Write the mechanism of S_N2 reaction for the preparation of methanol from methyl chloride.

24. Write the equations for the conversion : Cumene ⟶ Phenol

25. a)Name the hormone which tends to increase the glucose level in the blood
b)Which base forms hydrogen bond with adenine in double strand of DNA?

PART—C

IV. Answer any THREE of the following. Each question carries three marks : 3X3=9

26. a)Give two reasons : Transition elements and their compounds show catalytic properties.
b)Among Sc^{3+} and Cr^{3+} which one is colorless?

27. Write the balanced chemical equations for the manufacture of $K_2Cr_2O_7$ from chromite ore.

28. a)Give any two differences between lanthanoids and actinoids.
b)Among Cu^+ and Cu^{2+} which one is more stable in aqueous slon?

29. Explain hybridization, geometry and magnetic property of $[NiCl_4]^{2-}$ ion on the basis of VBT.(Atomic number of Ni = 28).

30. Draw Energy Level Diagram of Crystal Field Splitting in an Octahedral complex. What is Spectrochemical series?

V. Answer any TWO of the following. Each question carries three marks : 2X3=06

31. List out any three differences between Ideal and Non ideal solutions.

32. Write half cell reactions and cell reaction for the following electrochemical cell :
$Ni_{(s)} | Ni^{2+}{}_{(aq)} \| Ag^+{}_{(aq)} | Ag_{(s)}$

33. Write a neat labeled diagram of H_2—O_2 Fuel cell. Mention any two methods of preventing the rusting of iron.

34. Derive the integrated rate equation for a Zero order reaction.

PART—D

5+5+4+3

VI. Answer any FOUR of the following. Each question carries five marks : 4X5=20

35. a)Explain Wurtz-Fittig reaction with an example.
b) Write the steps involved in the conversion of Aniline to Chlorobenzene.
c)What are Grignard reagents?

36. a)Write the mechanism involved in the dehydration of ethanol into ethene.
b)Give the products formed when anisole is heated with HI.

37. a)Explain Gatterman – Koch reaction for the preparation of aldehydes.

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b)Two compounds A and B with same molecular formula C_3H_6O give positive test with 2,4-DNPH. On treating with Tollens reagent Compound A produces silver mirror but compound B does not. Give the name of the compounds A and B.

c)Name the reducing agent used in Clemmensen reduction.

38. a)Complete the following reactions :

i)  + CH_3-CO-Cl $\xrightarrow{\text{Anhyd AlCl}_3}$

ii) CH_3–CH_2–COOH $\xrightarrow[\text{ii) } H_2O]{\text{i) } Cl_2 \text{ / Red P}}$

iii) R–COOH + $SOCl_2$ $\longrightarrow$

b) Give reason : i) Acetic acid is weaker acid than Formic acid.

ii) Formaldehyde does not undergo aldol condensation.

39. a)Explain Hoffmann bromamide degradation reaction with an example.

b)What is Hinsberg's reagent? Among 1°, 2° and 3° amines which one does not react with it?

c)Name the product formed in the coupling reaction of benzene diazonium chloride with aniline. p-aminoazobenzene

40. a)Write the Haworth structure of Lactose.

b)What are fibrous proteins? Give an example.

c)Give the name of optically inactive naturally occurring α-amino acid.

PART—E (Numerical Problems)

VII. Answer any THREE of the following. Each question carries three marks: 3X3=09

41. Vapour pressure of chloroform ($CHCl_3$) and dichloromethane (CH_2Cl_2) at 298 K are 200 mm Hg and 415 mm Hg respectively. Calculate the vapour pressure of the solution containing 0.5 mol of $CHCl_3$ and 0.75 mol of CH_2Cl_2 at 298 K.

42. The boiling point of benzene is 353.23 K. When 1.80 g of a non-volatile solute was dissolved in 90 g of benzene, the boiling point is raised to 354.11 K. Calculate the molar mass of the solute. K_b for benzene is 2.53 K kg mol^{-1}.

43. Calculate EMF of the cell represented below :
$Zn \mid Zn^{+2}_{(0.1M)} \parallel Cu^{+2}_{(1M)} \mid Cu$ at 25°C (Given $E^\circ_{cell} = 1.1$ V).

44. The conductivity of 0.001 mol L^{-1} acetic acid is 4.95×10^{-5} S cm^{-1}. Calculate its degree of dissociation if Λ°_m for acetic acid is 390.5 S cm^2 mol^{-1}.

45. Show that in a first order reaction, $t_{99.9\%}$ is 10 times of $t_{50\%}$ of the reaction.

46. The rate constants of a reaction at 500K and 600K are $0.02s^{-1}$ and $0.2s^{-1}$ respectively. Calculate the Ea for the reaction (Given R = 8.314 $JK^{-1}mol^{-1}$).

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II PUC PREPARATORY EXAMINATION - 2025

CHEMISTRY (34)

Time 3-00 Hours **Max Marks 70**

DISTRICT : HAVERI

Instructions:

1. *Question paper has FIVE parts. All parts are compulsory.*
2. *a. Part-A carries 20 marks. Each question carries 1 mark. b. Part-B carries 06 marks. Each question carries 2 marks.*
   c. Part-C carries 15 marks. Each question carries 3 marks. d. Part-D carries 20marks. Each question carries 5 marks.
   e. Part-E carries 09 marks. Each question carries 3 marks.
3. *In Part-A questions, first attempted answer will be considered for awarding marks.*
4. *Write balanced chemical equations and draw neat labeled diagrams and graphs wherever necessary.*
5. *Direct answers to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.*
6. *Use log tables and simple calculator if necessary (use of scientific calculator is not allowed).*
7. *For a question having circuit diagram/figure/ graph/ diagram, alternate questions are given at the end of question paper in a separate section for visually challenged students.*

PART – A

I. **Select the correct option from the given choice.** **15 x 1 = 15**

1. Maximum amount of a solid solute that can be dissolved in a specific amount of a given liquid solvent does not depends upon
   a) Nature of solvent
   b) Pressure
   c) Nature of solute
   d) Temperature
2. The set of *3d* series elements shows anomalous electronic configurations.
   a) *Cr* and *Mn*
   b) *Cu* and *Zn*
   c) *Cr* and *Cu*
   d) *Mn* and *Zn* .
3. **Assertion**: The boiling points of alkyl halides decreases in the order of *RI>RBr>RCl>RF*.
   Reason: The boiling point of *RCl*, *RBr*and *RI* are considerably higher than that of hydrocarbons of comparable molecular mass (*R* is alkyl group).
   a) Assertion and reason both are correct statement but reason is not correct explanation of assertion.
   b) Assertion and reason both are wrong statements.
   c) Assertion is correct but reason is wrong statement.
   d) Assertion and reason both are correct and reason is correct explanation of assertion.
4. Which of the following alkyl halide will undergo S_N1 reaction most readily.
   a) $(CH_3)_3C - F$ b) $(CH_3)_3C - Cl$ c) $(CH_3)_3C - Br$ d) $(CH_3)_3C - I$
5. The electronic configuration of Cu (II) is $3d^9$ whereas Cu(I) is $3d^{10}$ which of the following is correct.
   a) *Cu (II)* is less stable
   b) *Cu (II)* is more stable
   c) Stability of both depends upon nature of their salts. d) *Cu(I)* and *Cu(II)* are equally stable.
6. Consider the Arrhenius equation $k = e^{-\frac{E_a}{RT}}$ and mark the correct option.
   a) Rate constant increases exponentially with increasing activation energy and decreasing temperature.
   b) Rate constant decreases exponentially with increasing activation energy and decreasing temperature.
   c) Rate constant increases exponentially with increasing activation energy and increasing temperature.
   d) Rate constant increases exponentially with decreasing activation energy and decreasing temperature.

7. Phenol is less acidic than
   a) o – nitrophenol
   b) ethanol
   c) o – methylphenol
   d) o – methoxyphenol

8. The compound that reacts fastest with Lucas reagent at room temperature is
   a) 2-methylpropan-2-ol
   b) butan-2-ol
   c) 2-methylpropan-1-ol
   d) butan-1-ol

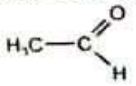
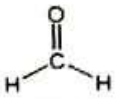
9. According to spectral chemical series, the strongest field ligand is
   a) F b) NH_3 c) H_2O d) CO

10. In a complex with secondary valence six, the set of d-orbitals which experience more repulsion withelectrons of ligands are
   a) $d_{x^2-y^2}$ & d_{z^2}
   b) $d_{xy}d_{yz}$&d_{zx}
   c) $d_{xy}d_{yz}$& $d_{x^2-y^2}$
   d) $d_{yz}d_{zx}$& d_{z^2}

11. Match the reactions given in the *column I* with suitable reagents given in *column II*

	Column I	Column II
i.	Ethanenitrile → Acetaldehyde	A. Zn-Hg/conc.HCl
ii.	Toluene → Benzaldehyde	B. Cl_2, Red – Phosphorus / H_2O
iii.	Acetic acid → Chloroacetic acid	C. $SnCl_2$, HCl / H_3O^+
iv.	Acetone → propane	D. CrO_2Cl_2 / H_3O^+

   a) i – A, ii – B, iii – C, iv – D
   b) i – D, ii – C, iii – B, iv – A
   c) i – C, ii – D, iii – B, iv – A
   d) i – D, ii – A, iii – C, iv – B

12. Cannizzaro's reaction is not given by
   a) 
   b) 
   c) 
   d) 

13. In a reaction, when the concentration of reactant is increased two times, the increase in rate of reaction was four times. Order of reaction is:
   a) First order
   b) Zero order
   c) Pseudo first order
   d) second order

14. Consider three gaseous alkylamines A, B and C are 1°, 2° and 3° respectively. What will be the correct order of their basicity?
   a) A > B > C
   b) C > B > A
   c) B > A > C
   d) B > C > A

15. Which amine of the following will not give carbylamine reaction?
   a) Ethylamine
   b) Dimethylamine
   c) Methylamine
   d) Phenylamine

II. Fill in the blanks by choosing the appropriate word from those given in the brackets. **5x1=5**

[ethers, Zaitsev,Benzenesulphonyl chloride, zinc, rate expression,phenol]

16. Dehydrohalogenation of halo alkanes follows_____ rule.
17. The equation that relates rate of reaction and concentration of reactants is _____.

18. Brass is an alloy of copper and _____.

19. _____ are called as anhydrides of monohydric alcohol.

20. _____ is also known as Hinsberg's reagent.

PART – B

III. Answer any THREE of the following. Each question carries TWO marks. **3x2 = 6**

21. What is the composition of Mischmetall? Write one use of it.

22. How do you obtain biphenyl from haloarenes? Write the name of reaction.

23. State Henry's law. What is the significance of Henry's Constant?

24. Name the disease causeddue to the deficiency of vitamin A and vitamin D.

25. Alcohols are weaker acids than water. give reason.

PART – C

IV. Answer any THREE of the following. Each question carries THREE marks. **3x3 = 9**

26. Write the balanced chemical equations for the reactions involved in preparation of potassium dichromite from chromite ore. 3

27. a) Which is a stronger reducing agent Cr^{2+} or Fe^{2+} and why? 2

    b) Why do the transition elements exhibit higher enthalpies of atomisation? 1

28. What is lanthanoid contraction? Write any two consequences of it. 3

29. Based on VBT explain geometry, hybridisation and magnetic property of $[CoF_6]^{3-}$ ion. 3

30. Write any three postulates of Warner's theory of coordination compounds. 3

V. Answer any TWO of the following. Each question carries THREE marks. **2x3 = 6**

31. a) Give any two differences between ideal and non-ideal solutions. 2

    b) When fruits and vegetables that have dried are placed in water they slowly swell and return to the original form. Give reason. 1

32. With neat labelled diagram of standard hydrogen electrode, write reduction half reaction and its cell notation. 3

33. a) What is corrosion? Write chemical composition iron rust. 2

    b) State Kohlrausch's law of independent migration of ion. 1

34. Derive integrated rate equation for zero order reaction. 3

PART – D

VI. Answer any FOUR of the followings. Each question carries FIVE marks. **4x5= 20**

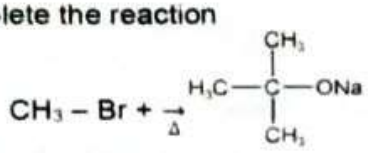
35. a) Explain the mechanism involved in the conversion of tertiary butyl bromide into tertiary butyl alcohol. Mention the order of kinetics of the reaction. 3

    b) Compare to alkyl halide aryl halides are less reactive towards nucleophilic substitution, give reasons. 2

36. a) When an organic compound A is trated with strong base NaOH gives a compound B Which on treated with CO_2 gas at 413K and 6-7 atmospheric pressure gives sodium salicylate which is on acidification yields C. Write chemical reaction and name of A,

B and C. 4

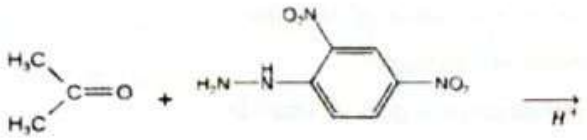
b) Complete the reaction 1



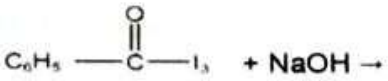
37. a) Explain Rosenmund reduction reaction with an example. 2

b) Write the products of the reactions 2

i.



ii.



c) Name the product formed when ketone react with ethylene glycol in presence of dry HCl. 1

38. a) How do you prepare carboxylic acid using Grignard reagent? 2

b) What is the effect of presence of NO_2 and CN^- group in carboxylic acids on its acidic strength. 2

c) Name the carboxylic acid used in the manufacture of nylon-6,6. 1

39. a) Describe Gabrial Phthalimide synthesis. 3

b) What are factors affecting the basic strength of alkyl amines? 2

40. a) Write the Haworth structure for maltose. 2

b) Give one example each. 2

i. Fibrous protein. ii. polypeptide hormone. 2

c) Name the nitrogen base present only in RNA but not in DNA. 1

PART – E

VII. Answer any THREE of the followings. Each question carries THREE marks. **3x3=9**

41. The boiling point of benzene is 353.23 K. When 1.80g of a non-volatile solute was dissolved in 90 gram ofbenzene, the boiling point is raised to 354.11 K. Calculate the molar mass of the solute. K_b for benzene is2.53 KKg/mol.

42. Calculate the osmotic pressure in pascals exerted by a solution prepared by dissolving 1.0 g of polymer of molar mass 185,000 in 450 mL of water at 37°C.

43. Represent the cell in which the following reaction takes place $Mg_{(s)} + 2Ag^+_{(0.0001M)} \rightarrow Mg^{2+}_{(0.130M)} + 2Ag_{(s)}$. Calculate its $E_{(cell)}$ if $E^o_{cell} = 3.17$ V.

44. Calculate the limiting molar conductivity of Cl^- by using the data Λ° for $CaCl_2$is 271.6 S cm^2 mol^{-1} and Λ° for Ca^{2+} = 119.0 S cm^2 mol^{-1}.

45. A first order reaction is found to have a rate constant, k = 5.5 × 10-14 s-1.Find the half-life of the reaction.

46. The rate constants of a reaction at 500K and 700K are 0.02s^{-1} and0.07s^{-1} respectively. Calculate the values of E_a and A.

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GOVERNMENT OF KARNATAKA Register Number :

DEPUTY DIRECTOR, DEPT. OF SCHOOL EDUCATION (PRE-UNIVERSITY)

PUC-II YEAR PREPARATORY EXAMINATION-2025

Time : 3 Hours | SUBJECT : **CHEMISTRY (34)** | MARKS : 70

DISTRICT : KALABURGI

Instructions : 1) The question paper has five parts A, B, C, D & E. All parts are compulsory.

2) a) **PART-A** Carries 20 marks, Each question carries one mark. b) **PART-B** Carries 6 marks, Each question carries two marks, c) **PART-C** Carries 15 marks, Each question carries three marks, d) **PART-D** Carries 20 marks, Each question carries five marks. e) **Part-E** carries 9 marks, each question carries three marks.

3) In Part-A questions, **first attempted answer** will be considered for awarding marks.

4) Write balanced chemical equations and draw neat labeled diagrams & graphs wherever required.

5) Direct answers to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.

6) Use log tables and the simple calculator if necessary. (Use of scientific calculator is not allowed)

PART - A

I. Select the correct option from the given choices : 15X1=15

1) **Isotonic solutions are having the same**
   a) surface tension b) vapour pressure c) osmotic pressure d) viscosity

2) **The molar conductivity is maximum for the solution of concentration**
   a) 0.005 M b) 0.001 M c) 0.004 M d) 0.002 M

3) **The half-life period of a first order reaction is 15 minutes. The amount of substance left after one hour will be**
   a) one half b) one fourth c) one eighth d) one sixteenth

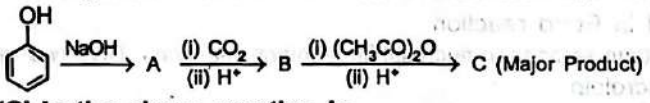
4) **Slope of the plot of log k versus (1/T) is 5.64. Activation energy in $Jmol^{-1}$ will be**
   a) 108 b) 98 c) 118 d) 138

5) **Number of moles of $K_2Cr_2O_7$ reduced by one mole of Sn^{+2} ion is**
   a) 1/3 b) 3 c) 1/6 d) 6

6) **Which of the following shall form an octahedral complex ?**
   a) d^4 (low spin) b) d^8 (high spin) c) d^6 (low spin) d) none of these

7) **The terminal and bridged CO ligands in the compound $[CO_2(CO)_8]$ are respectively,**
   a) 0, 2 b) 6, 1 c) 5, 2 d) 6, 2

8) **Which of the following is the preferred reagent to convert alcohol into alkyl halide ?**
   a) PCl_3 b) HCl c) PCl_5 d) $SOCl_2$

9) 

   'C' in the above reaction is
   a) Salicylaldehyde b) aspirin c) cumene d) picric acid

10) **How many alcohols with molecular formula $C_4H_{10}O$ are chiral in nature ?**
   a) 1 b) 2 c) 3 d) 4

11) **What is the test to differentiate between pentan-2-one and pentan-3-one ?**
   a) Iodoform test b) Benedicts test c) Fehling's test d) Aldol condensation

12) **Which of the following compounds would have the smallest value of pK_a ?**
   a) $CHF_2CH_2CH_2COOH$ b) $CH_3CH_2CF_2COOH$
   c) $CH_2FCHFCH_2COOH$ d) $CH_3CF_2CH_2COOH$

13) **The gas evolved when methylamine reacts with nitrous acid is**
   a) NH_3 b) N_2 c) H_2 d) C_2H_6

14) **Amine that cannot be prepared by Gabriel-phthalimide synthesis is**
   a) aniline b) benzyl amine c) methyl amine d) is-butyl amine

15) **A unit in nucleic acid which contains 'base-sugar-phosphate' unit is called**
   a) nucleotide b) nucleoside c) phosphotide d) polypeptide

II. Fill in the blanks by choosing the appropriate word from those given in the brackets : 5X1=5
[phosgene, HNO_3, electrochemical, acetone, bromine water, interstitial]

16) Rusting of iron is an ..... process.
17) ..... compounds are usually non-stoichiometric.
18) Chloroform on oxidation with air in presence of light forms .....
19) In the manufacture of phenol from cumene ..... a by-product formed.
20) Glucose gets oxidised to gluconic acid on reaction with a mild oxidising agent like .....

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PART-B

III. Answer ANY THREE of the following questions. Each question carries two marks. 3X2=6

21) State Henry's law. Write its mathematical expression.

22) What is the common oxidation state shown by Lanthanoids ? Mention any one consequence of Lanthanoid contraction.

23) Complete the following reaction and name the reaction. $C_6H_5-Br + CH_3-Br \xrightarrow{Na/Dry\ ether} X + 2NaBr$

24) Explain Williamson's Ether synthesis.

25) What are essential amino acids ? Give an example.

PART-C

IV. Answer ANY THREE of the following questions. Each question carries three marks. 3X3=9

26) Write the balanced chemical equations for the reactions involved in preparation of potassium permanganate from MnO_2. Write the structure of manganate ion. (3)

27) The transition metals form a large number of complex compounds. Give three reasons. (3)

28) Using valence bond theory, explain geometry, hybridization and magnetic property of $[CoF_6]^{3-}$ ion. (Atomic number of Cobalt is 27) (3)

29) a) Write structures of geometrical isomers of $[Co(NH_3)_3(NO_2)_3]$ (2)
b) Give the IUPAC name of $[CoCl_2(en)_2]^+$. (1)

30) a) Based on crystal field theory, write the configuration for metal with d^5 electron system, when i) $\Delta_o < P$ ii) $\Delta_o > P$ (2)
b) Give the composition of Wilkinson's catalyst. (1)

V. Answer ANY TWO of the following questions. Each question carries three marks. 2X3=6

31) What is reverse osmosis ? Mention one of its practical uses and give an example for artificial semipermeable membrane. (3)

32) a) Give the products obtained at each electrode respectively when molten NaCl and aqueous NaCl undergoes electrolysis. (2)
b) What are fuel cells ? (1)

33) a) Give reasons : i) Zinc displaces copper from copper sulphate solution.
ii) Zinc displaces hydrogen from HCl, but copper does not. (2)
b) How much charge in faraday is required to reduce 1 mole of MnO_4^- to Mn^{2+} ? (1)

34) Derive integrated rate equation for first order reaction. (3)

PART-D

VI. Answer ANY FOUR of the following questions. Each question carries five marks. 4X5=20

35) a) Write the steps involved in mechanism of conversion of 2-chloro-2methyl butane into 2-methyl-butan-2-ol. Mention its order. (3)
b) Explain Sandmeyer's reaction with an example. (2)

36) a) Write the mechanism of acid catalysed dehydration of ethanol to ethane. (3)
b) How is phenol prepared from chlorobenzene ? Write the chemical reaction. (2)

37) a) Write the reaction involved in Etard reaction. (2)
b) Aldehydes are more reactive than ketones in nucleophilic addition reactions. Give two reasons. (2)
c) Give the IUPAC name of Acrolein. (1)

38) a) An organic compound contains 69.77% carbon, 11.63% hydrogen and rest oxygen. The molecular mass of compound is 86. It does not reduce Tollens' reagent but forms an addition compound with sodium hydrogen sulphite and give positive iodoform test. On vigorous oxidation it gives ethanoic and propanoic acid. Write the possible structure of the compound and its IUPAC name. (2)
b) Explain HVZ (Hell-Volhard-Zelinsky) reaction with equation. (2)
c) Arrange the following compounds in increasing order of their acid strength: Benzoic acid, 4-Methoxybenzoic acid and 4-Nitrobenzoic acid. (1)

39) a) Explain Hoffmann-bromamide degradation reaction with an example. (2)
b) What is diazotization ? Write the general formula of diazonium salts. (2)
c) Give the increasing order of boiling points of isomeric amines. (Primary, secondary and tertiary). (1)

40) a) Write the Haworth structure of lactose. (2)
b) What are vitamins ? Deficiency of which vitamin causes night blindness ? (2)
c) What type of linkage is responsible for the formation of proteins ? (1)

PART-E (Numerical Problems)

VII. Answer ANY THREE of the following questions. Each question carries three marks. 3X3=9

41) Vapour pressure of pure water at 298 K is 23.8 mm Hg. 50 g of urea (NH_2CONH_2) is dissolved in 850 g of water. Calculate the vapour pressure of water for this solution and its relative lowering.

42) Calculate the concentration (in g/L) of that solution of sugar which has osmotic pressure of 2.46 atmosphere at 300 K.

43) Calculate the potential of hydrogen electrode in contact with a solution whose pH is 10.

44) If a current of 0.5 ampere flows through a metallic wire for 2 hours, then how many electrons flow through the wire ?

45) The rate of reaction quadruples when the temperature changes from 293 K to 313 K. Calculate the energy of activation of the reaction assuming that it does not change with temperature.

46) During nuclear explosion, one of the products is ^{90}Sr with half-life of 28.1 years. If 1mg of ^{90}Sr was absorbed in the bones of a newly born baby instead of calcium, how much of it will remain after 10 years and 60 years if it is not lost metabolically.

Collection Of Question Papers For POCKET MARKS 70/70

II PUC Preparatory examination Jan-2025
Subject: CHEMISTRY (34)

Time:3.00 hours. **Max. marks:70**

DISTRICT : KODAGU

INSTRUCTIONS:

1. Question paper has **FIVE parts.** All parts are compulsory.
2. In PART-A questions, **first attempted answer** will be considered for awarding marks.
3. Write balanced chemical equations and draw neat labelled diagrams and graphs wherever necessary.
4. Direct answers to the numerical problems without detailed specific unit for final answers will not carry any marks.
5. Use log tables and simple calculator if necessary. (Use of scientific calculator is not allowed).

PART-A

I. Select the correct option from the given choices. **[15×1=15]**

1. The compound that reacts fastest with Lucas reagent at room temperature is
   a) butan-1-ol b) butan-2-ol c) 2-methylpropan-1-ol d) 2-methylpropan-2-ol

2. Which of the following vitamins are soluble in water?
   a) A b) C c) D d) E

3. According to spectrochemical series, the strongest field ligand is
   a) CO b) NH_3 c) H_2O d) F^-

4. Statement I: Enantiomers possess different physical properties like melting point, refractive index etc.
   Statement II: Equimolar mixtures of two enantiomers are called racemic mixtures.
   Identify the correct statement
   a) Both Statement I and II are correct
   b) Both Statement I and II are incorrect
   c) Statement I is correct and Statement II is incorrect.
   d) Statement I is incorrect and Statement II is correct.

5. In the reaction $A+3B \rightarrow 2C$, the rate of formation of C is
   a) same as rate of consumption of A b) same as rate of consumption of B
   c) twice the rate of consumption of A d) 3/2 times the rate of consumption of B

6. The stability of $Cu^{2+}_{(aq)}$ rather than $Cu^{+}_{(aq)}$ is due to
   a) more positive $\Delta_{hyd}H$ of $Cu^{+}_{(aq)}$ compensates second ionisation enthalpy of Cu.
   b) more negative $\Delta_{hyd}H$ of $Cu^{+}_{(aq)}$ compensates second ionisation enthalpy of Cu.
   c) more positive $\Delta_{hyd}H$ of $Cu^{2+}_{(aq)}$ compensates second ionisation enthalpy of Cu.
   d) more negative $\Delta_{hyd}H$ of $Cu^{2+}_{(aq)}$ compensates second ionisation enthalpy of Cu.

7. The standard reduction potential of three metals X, Y and Z are -1.2 V, +0.5 V and -3.0 V respectively. The reducing power of these metals will be
   a) Y> Z > X b) X >Y> Z c) Z >X >Y d) X > Y> Z

8. Anisole on reaction with HI forms
   a) Phenol and Iodomethane b) Iodobenzene and methanol
   c) Benzene and Iodomethane d) Phenol and methanal

9. The correct order of osmotic pressure of 0.01M aqueous solution of the following is
   1) Sucrose > CH_3COOH > KCl 2) CH_3COOH > Sucrose > KCl
   3) Sucrose > KCl > CH_3COOH 4) KCl > CH_3COOH > Sucrose

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10. Match the column-I with column-II and choose the correct answer using the codes given below:

Column-I (Conversion)	Column-II (Number of Faraday required)
(A) 1 mol of H_2O to O_2	(p) 3F
(B) 1 mol of MnO_4^- to Mn^{2+}	(q) 2F
(C) 1 mol of Al^{3+} to Al	(r) 1F
(D) 1 mol of FeO to Fe_2O_3	(s) 5F

a) (A)-q; (B)-s; (C)-p; (D)-r
b) (A)-r; (B)-s; (C)-p; (D)-q
c) (A)-q; (B)-r; (C)-p; (D)-s
d) (A)-r; (B)-s; (C)-q; (D)-p

11. What happens when a carboxylic acid is reduced with $LiAlH_4$?
a) Aldehyde is formed
b) Primary alcohol is formed
c) Ketone is formed
d) Grignard reagent is formed

12. Which of the following reactions could not be explained on the basis of open chain structure of glucose?
a) Pentaacetate of glucose does not react with NH_2OH
b) Glucose on prolonged heating with HI gives n-Hexane
c) Glucose on oxidation with bromine water forms gluconic acid
d) With acetic anhydride glucose gives glucose pentaacetate

13. Arrange the following compounds in the increasing order of their boiling points.
I. $CH_3CH_2CH_2Br$ II. $CH_3CH_2CH_2CH_2Br$ III. $(CH_3)_2CHCH_2Br$ IV. $(CH_3)_3CBr$
a) II<I<III<IV b) I<III<IV<II c) IV<III<II<I d) I<IV<III<II

14. Which statement is not correct for Benzene sulphonyl chloride?
a) It is known as Hinsberg's reagent.
b) It is used to distinguish primary and secondary amines.
c) On treatment with secondary amine, it leads to form a product that is soluble in alkali.
d) It doesn't react with tertiary amines

15. Ammonolysis involves
a) electrophilic addition reaction.
b) electrophilic substitution reaction.
c) nucleophilic addition reaction.
d) nucleophilic substitution reaction.

II. Fill in the blanks by choosing the appropriate word from those given in the brackets. [5 X 1=5]
[zero, one, two, three, Primary alcohol, Primary amine]

16. Formaldehyde when reacted with methyl magnesium bromide followed by hydrolysis gives_____
17. For a reaction, Rate constant k $=10^{-4}$ $mol.L^{-1}s^{-1}$. The order of the reaction is _____
18. Nitriles on catalytic hydrogenation produce_____
19. The magnetic moment of transition metal ion is found to be 3.87 BM. The number of unpaired electrons present in it is_____
20. The Van't Hoff factor for 0.01M $KCl_{(aq)}$ is_____

PART - B

III. Answer ANY THREE of the following. Each question carries two marks. [3 X 2=06]

21. Explain Swarts reaction with an example.
22. What does P and Z_{AB} represent in the equation: Rate = $PZ_{AB}\, e^{-\frac{E_a}{RT}}$?
23. How does Phenol react with conc. Nitric acid? Give equation.
24. Write the Haworth structure of maltose.
25. What is the common oxidation state shown by Lanthanoids? Mention any one consequence of Lanthanoid contraction.

PART -C

IV. Answer ANY THREE of the following. Each question carries three marks. [3 X 3 =09]

26. When MnO_2 is fused with an alkali metal hydroxide and an oxidising agent like KNO_3 to give dark green coloured paramagnetic substance 'B'. The compound 'B' disproportionate in a neutral or acidic solution to give tetrahedral purple coloured compound 'C'. Identify the compound 'B' and write the balanced equations for the preparation of compound 'C' from MnO_2. (3)
27. Account for the following:
    i) Of the d^4 species, Cr^{2+} is strongly reducing while Mn^{3+} is strongly oxidising (2)
    ii) The transition metals generally form coloured compounds. (1)
28. Explain the hybridization, geometry and magnetic properties of $[CoF_6]^{3-}$ ion using VBT. (3)
29. What is crystal field splitting? Sketch the energy level diagram for the Crystal field splitting of d-orbitals in octahedral complex? (3)
30. a) Among tetrahedral and square planar complexes, which will not show geometrical isomerism? Write structures of geometrical isomers of $[Co(NH_3)_4(NO_2)_2]$

V. Answer ANY TWO of the following. Each question carries three marks. [2 × 3 = 06]

31. What are minimum boiling azeotropes? Give an example. What is the sign of $\Delta_{mix}H$ for such solutions?
32. During working of Leclanché cell, write the anodic and cathodic reactions. What is the role of produced ammonia during the cell reaction?
33. Derive integrated rate equation for first order gas phase reaction $A(g) \rightarrow B(g) + C(g)$.
34. a) Define limiting molar conductivity. How it is related to molar conductivity of strong electrolyte?
    b) Why conductivity decreases with decrease in concentration?

PART – D

VI. Answer ANY FOUR of the following. Each question carries five marks. [4 × 5 = 20]

35. a) Give the structures of 'B' and 'C' in the following reaction.

$$CH_3CH_2I \xrightarrow{NaCN} A \xrightarrow[\text{partial hydrolysis}]{OH^-} B \xrightarrow{NaOH+Br_2} C$$

    b) Give reasons for the following
    i) Aromatic primary amines cannot be prepared by Gabriel synthesis
    ii) Although amino group is o- and p- directing in aromatic electrophilic substitution reactions, aniline on nitration gives a significant amount of m-Nitroaniline.
    c) Name the aromatic compound produced when benzenediazonium chloride reacts with ethanol. [2+2+1]
36. a) Write equation for the reaction between benzaldehyde and conc. NaOH solution. Name the reaction.
    b) Explain preparation of propane by Wolff-Kishner reduction. Write chemical equation.
    c) Name The product formed by the oxidation of methyl benzene by alkaline $KMnO_4$. [2+2+1]
37. a) Write the mechanism for nucleophilic substitution reaction of tert- butyl bromide with aq. KOH.
    b) What happens when bromomethane is treated with sodium in the presence of dry ether? Name the reaction.
    c) Draw the structure of DDT. [2+2+1]
38. a) What is peptide bond? Give an example for dipeptide.
    b) What is denaturation of proteins? Mention the structure of protein which remains intact during this process.
    c) Name the monomer unit of Nucleic acids? [2+2+1]
39. a) Write the mechanism of acid catalysed dehydration of ethanol to ethene.
    b) Among Alcohol and Phenols which one is more acidic and why? [3+2]
40. a) Write the IUPAC name and structure of the product obtained when benzene reacts with acetyl chloride in presence of anhydrous $AlCl_3$.
    b) Aldehydes are more reactive than ketones in nucleophilic addition reactions. Give two reasons.
    c) Write one use of Tollens' reagent. [2+2+1]

PART – E
(NUMERICAL PROBLEMS)

VII. Answer ANY THREE of the following. Each question carries three marks. **[3 × 3 = 09]**

41. A solution containing 18 g of non-volatile non-electrolyte solute is dissolved in 200 g of water freezes at 272.07 K. Calculate the molecular mass of solute. Given K_f = 1.86 Kkg/mol, freezing point of water = 273.15 K.

42. Calculate the emf of the cell in which the following reaction takes place:
$Ni_{(s)} + 2Ag^{+}_{(aq)}(0.002M) \rightarrow Ni^{2+}_{(aq)}(0.160M) + 2Ag_{(s)}$. Given: $E^{\circ}_{(Ni^{2+}/Ni)} = -0.25V$ and $E^{\circ}_{(Ag^{+}/Ag)} = 0.8\,V$.

43. The molar conductivity of NaCl, HCl and CH_3COONa at infinite dilution are 126.45, 426.16 and 91 Scm^2mol^{-1} respectively. Calculate the limiting molar conductivity of CH_3COOH.

44. A first order reaction has a rate constant $1.15 \times 10^{-3}s^{-1}$. How long will 5 g of this reactant take to reduce to 3 g?

45. Calculate the mass of a non-volatile solute (molar mass 40 g mol^{-1}) which should be dissolved in 114 g octane to reduce its vapour pressure to 80%.

46. The rate of the chemical reaction doubles for an increase of 10K in absolute temperature from 298K. Calculate Ea.

Collection Of Question Papers For POCKET MARKS 70/70

MM

SECOND PUC PREPARATORY EXAMINATION JANUARY - 2025

Sub: CHEMISTRY (34)

Time: 3 Hrs

Total no. of questions : 46
Total Marks: 70

DISTRICT : KOLAR

Instructions:

(i) The question paper has Five parts. All the parts are compulsory.

(ii) (a) Part – A carries 20 marks. Each question carries one mark.
(b) Part – B carries 6 marks. Each question carries two marks.
(c) Part – C carries 15 marks. Each question carries three marks.
(d) Part – D carries 20 marks. Each question carries five marks.
(e) Part – E carries 9 marks. Each question carries three marks.

(iii) In part – A questions, first attempted answer will be considered for awarding marks.

(iv) Write balanced chemical equations and draw neat labeled diagrams and graphs wherever necessary.

(v) Direct answer to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.

(vi) Use log tables and simple calculator if necessary. (use of scientific calculator is not allowed)

(vii) For a question having circuit / figure / graph / diagram, alternate questions are given at the end of question paper in a separate section for visually challenged students.

PART – A

I. Select the correct option from the given choices. $15 \times 1 = 15$

1. Which of the following aqueous solutions should have the highest boiling point
(a) 1.0 M NaOH (b) 1.0 M Na_2SO_4 (c) 1.0 M NH_4NO_3 (d) 1.0 M KNO_3

2. While charging the lead storage battery
(a) $PbSO_4$ cathode is reduced to Pb (b) $PbSO_4$ cathode is oxidized to Pb
(b) $PbSO_4$ anode is oxidized to PbO_2 (d) $PbSO_4$ anode is reduced to Pb

3. $2H_2O_2 \xrightarrow{I^-/\text{Alkaline medium}} 2H_2O + O_2$ is an example for
(a) Zero order reaction (b) Second order reaction
(c) First order reaction (d) Fractional order reaction

4. Fluorine has highest standard electrode potential indicating that fluorine gas is
(a) strongest reducing agent (b) strongest oxidising agent
(c) weak oxidizing agent (d) SEP value is zero

5. Which of the following actinoids show oxidation states upto + 7.
(a) Am (b) Th (c) U (d) Np

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6. Which of the following species is not a ligand

(a) $\overset{+}{N}H_4$ (b) NO (c) CO (d) $H_2N-CH_2-CH_2-NH_2$

7. The chiral molecule among the following is

(a) 1-Bromo butane (b) 2-Bromobutane

(c) 2-Bromo propane (d) 2-Bromopropan-2-ol

8. Ethane-1, 2-diol is an example for

(a) monohydric alcohol (b) dihydric alcohol

(c) dihydric phenol (d) monohydric phenol

9. Phenol is more acidic than

(a) ethanol (b) o-nitrophenol (c) m-nitrophenol (d) p-nitrophenol

10. Which of the following compound does not reduce Fehlings solution?

(a) HCHO (b) CH_3CHO (c) C_6H_5CHO (d) CH_3CH_2CHO

11. Which of the following compound gives benzamide with ammonia?

(a) CH_3COOH (b) HCOOH (c) C_6H_5COOH (d) CH_3CH_2COOH

12. The IUPAC name of ethyl dimethyl amine is

(a) N, N-dimethyl methanamine (b) N, N-diethyl ethanamine

(c) N, N-dimethyl ethanamine (d) N, N-diethylmethanamine

13. Benzene diazonium chloride react with phenol gives

(a) P-hydroxy azobenzene (b) o-hydroxy azobenzene

(c) m-hydroxy azobenzene (d) benzene

14. Among the following acid, the vitamin is

(a) aspartic acid (b) ascorbic acid (c) adipic acid (d) glutamic acid

15. The nitrogen base adenine forms hydrogen bond with

(a) thymine (b) cytocine (c) guanine (d) uracil

II. Fill in the blanks by choosing the appropriate word from those given in the brackets: $5 \times 1 = 5$

(zinc, benzene sulphonyl chloride, lower, elementary, manganese, carbonyl chloride)

16. Higher the value of Henry's constant _____ is the solubility.

17. Molecularity is applicable only for _____ reactions.

18. The element which has completely filled $3d^{10}$ configuration in its ground state as well in common oxidation state is _____

19. The poisonous gas formed when chloroform is exposed to air and light is _____.

20. Hinsberg's reagent is _____.

PART – B

III. Answer any THREE of the following. Each question carries TWO marks. $3 \times 2 = 6$

21. What is reverse osmosis? Mention one of its use.
22. Show that half period of a first–order reaction is independent of initial concentration.
23. Write cis and trans isomers of $[MX_2Y_2]$.
24. Complete and name the reaction: $R-\overset{\overset{O}{\|}}{C}-CH_3 \xrightarrow{NaOH+I_2}$.
25. What are essential amino acids? Write one example.

PART – C

IV. Answer any THREE of the following. Each question carries THREE marks. $3 \times 3 = 9$

26. Explain the manufacture of potassium permanganate ($KMnO_4$) from manganese dioxide with balanced equations.
27. The atomic number of a divalent ion in aqueous solution is 25, how many unpaired electrons are present in it? And name the element.
28. Transition metals forms large number of complex compounds mention any three reasons.
29. For the complex $[Co(en)_3]^{3+}$.
    (i) Write the IUPAC name
    (ii) What is the oxidation state of central metal ion
    (iii) What is the coordination number of central metal ion
30. Explain hybridization, geometry and magnetic property of $[CoF_6]^{3-}$ using U.B.T.

V. Answer any TWO of the following. Each question carries THREE marks. $2 \times 3 = 6$

31. What are azeotropes? Name the types of azeotropes.
32. With respect standard hydrogen electrode (SHE).
    (i) Name the electrode used (ii) What is the acid used
    (iii) Write the electrode reaction, when it act as the cathode.
33. Explain the product of electrolysis of aqueous solution of sodium chloride.
34. Derive integrated rate equation for zero order reaction.

PART - D

VI. Answer any FOUR of the following. Each question carries FIVE marks. $4 \times 5 = 20$

35. (a) Explain SN^1 mechanism by taking tert-butyl bromide as example.
    (b) Write the reaction between ethyl bromide and alcoholic silver cyanide (AgCN) and name the product formed. (3 + 2)

36. (a) Write the steps involved in the mechanism of catalytic dehydration of ethanol (C_2H_5OH) to ethene ($CH_2 = CH_2$).

    (b) What is the name of the mixture anhydrous zinc chloride and concentrated hydrochloric acid? Which degree of alcohol will react faster with this mixture? (3 + 2)

37. (a) For the reaction between sodium phenate and carbon dioxide, followed by acidification. Name the product formed and name the reaction.

    (b) How does anisole react with Br_2 in CH_3COOH? (3 + 2)

38. (a) Write the equation for the reaction between CH_3CHO and CH_3CH_2CHO in the presence of dil. NaOH. Name the reaction and write the IUPAC name of the product formed.

    (b) How is benzaldehyde prepared by Gatterman – KOCH reaction? (3 + 2)

39. (a) How is methyl amine prepared by Hoff-mann bromamide degradation reaction?

    (b) Between CH_3NH_2 and $C_6H_5NH_2$ which is more basic? Why? (3 + 2)

40. (a) What does tertiary structure of proteins represent? Write its two major molecular shapes.

    (b) Write a reaction to show glucose contains 5-OH groups.

    (c) Write Zwitter ion structure of glycine. (2 + 2 + 1)

PART – E (Numerical Problems)

VII. Answer any THREE of the following. Each question carries THREE marks. $3 \times 3 = 9$

41. Calculate the mass of vitamin C (mol mass = 176 g mol^{-1}) to dissolved in 78 g of acetic acid to lower its melting point by 1.5°C. Given K_f of acetic acid is 3.9 K kg mol^{-1}.

42. Vapour pressure of water at 293 K is 17.535 mm Hg. Calculate the vapour pressure of water at 293 K when 25 g glucose ($C_6H_{12}O_6$) dissolved in 450 g of water. (mol. mass of H_2O = 18 g mol^{-1}, mol mass glucose 180 g mol^{-1}).

43. Calculate the limiting molar conductivity of Cl^- by using the limiting molar conductivity of $CaCl_2$ = 271.6 S cm^2 mol^{-1} and limiting molar conductivity of Ca^{2+} = 119.0 Scm^2 mol^{-1}.

44. Calculate ΔG° for the cell reaction.

$$2Fe^{3+}_{(aq)} + 2I^-_{(aq)} \longrightarrow 2Fe^{2+}_{(aq)} + I_{2(s)}$$

$$\left(E^\circ_{cell} = 0.236\ V, F = 96487\ C\right)$$

45. For a first order reaction, the half life period is 120 mins. Calculate the time required to complete 90% of the reaction.

46. The rate of a particular reaction quadruples when temperature changes from 293 K to 313 K. Calculate the activation energy for the reaction. (R = 8.314 JK^{-1} mol^{-1})

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Collection Of Question Papers For POCKET MARKS 70/70

Department of Pre-University Education

District Level II PUC Preparatory Examination 2024-25

Sub: Chemistry

Time : 3 hour | Max Marks : 70

DISTRICT : KOPPALA

Instructions. 1. The question paper has 5 parts all parts are compulsory.
2. Part A contains 20 marks. each question carries 1 mark.
Part B contains 06 marks each question carries 2 marks.
Part C contains 15 marks each questioncarries3 marks.
Part D contains 20 marks each question carries 5 marks.
Part E contains 09 marks each question carries 3 mark..
3. For part A questions only first written answers will be considered for evaluation.
4. Rate balanced chemical equations and draw neat labelled diagrams and grapes wherever necessary.
5. Direct answers to the numerical problems without detailed steps and specifics unit for final answer will not carry any marks
6. Use log tables and simple calculator if necessary. (Use of scientific calculator is not allowed).

PART-A

I Select the correct option from the given choices 15x1=15

1) The value of Henry's constant KH is.
a) Greater for gases with higher solubility. b) Greater for gases with lower solubility
c) Constant for all gases d) Not related to the solubility of gases.

2) in a solution containing non volatile solute the mole fraction of the solvent is 0.9.The relative lowering of vapour pressure is.
a)1. b) 0.1 c)0.9 d)1.1.

3) While charging The LeadStoragebattery.
a) $PbSO_4$ anode is reduced to Pb. b) $PbSO_4$ Cathode is oxidized to Pb.
c) $PbSO_4$ cathode is oxidised to Pb. d) $PbSO_4$ anode as oxidized to PbO2.

4) Unit of rate constant of reaction is same as that of its rate. The order of the reaction.
a) Zero order. b) first order. c) second order. d) pseudo order.

5) Which of the following statement about Transition Element is incorrect.
a) They show variable Oxidation State. b) All the ions are coloured.
c) The exhibit diamagnetic and paramagnetic property. d) The exhibit catalytic property.

6) In $Fe(CO)_5$, Fe – C Bond processes.
a) π - character only b) Both σ- and π- characters.
c) Ionic character. d) σ -character

7) Which of the following halogen exchange reaction will occur.
a) R-I + Nacl b) R-F +Kcl c) R-cl +Nal d)CH3-F + AgBr.

8) Name the by product during the preparation of phenol from cumene is.
a) Acetone. b) cresol. c) alcohol d) acetaldehyde.

9) Major product of the following reaction.

$$2C_2H_5OH \xrightarrow[413\ K]{Conc.H2SO4} ----$$

a) $CH_2=CH_2$ .b)$(C_2H_5)2O$. c)C_2H_6. d)CH_3OCH_3.

10) The following reagents are used for introducing a formyl (-CHO) into the benzene ring.
a) CO +Hcl. b)$(CH_3CO)_2O$ followed by acid hydrolysis.
c) CrO_2Cl_2 followed by hydrolysis. d) none of the above.

11) strongest carboxylic acid among the following is,
a) Aeticacid. b)Trichloroacetic acid c)Trifluro acetic acid d) Dichloro acetic acid

12) the correct increasing order of basic strength of the following compounds is
Aniline (I) , p-nitroaniline(II), 4- methyl aniline. (III)
a) II <III < I . b)III < I < II . c) III< II <I . d) II< I <III.

13) Hinsberg's reagent is
a) Benzene Sulphuryl chloride. b) chlorobenzene.
c) Benzin sulphonyl chloride.. d) Benzene carbonyl chloride.

P.T.O

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14) (A) glycosidic linkage (p) monomeric units of nucleic acids.
(B) peptide Bond. (q) sugar heterocyclic base combination.
(C) nucleosides (r) linkage between two amino acids.
(D) nucleotides (s) linkage between two monosaccharides.
(a) A-r, B-s, C-p, D-q. (b) A-s, B-r, C-q, D-p.
(c) A-r, B-s, C-q, D-p. (d) A-s, B-r, C-p, D-q

15) Name Disaccharide gives a ketose and aldose only on hydrolysis.
a) lactose. b) maltose. c) sucrose. d) none of the above.

II) Fill in the blanks by choosing the appropriate word those given in the brackets.

(Carbonyl chloride, six, CO_2., ketones, liquid)

16) Oxygen dissolved in water is an example of -----solution.

17) Acidified $KMnO_4$ oxidises oxalate Ion into --------.

18) Coordination number of Cobalt [$Cocl_2(NH_3)_4$]cl. Is ----.

19) Chemical name of phosgene poisonous gas is --------.

20) Reduction of aldehyde Yield primary alcohol whereas ------ yield secondary alchohal.

PART-B

III)Answer any three of the following each question carries two marks. **(3×2=6)**

21) write any two factors responsible for effective collisions.

22)calculate the spin only magnetic moment of ferrous iron.

23) what is chirality ?. Give an example of optical active chiral molecule.

24) what is the effect of --CH3, --NO2 substituents on acidity of phenols with reason.

25) what is denaturation of proteins ? which level of structure remaining intact during the denaturation of globular protein.

PART – C

IV. Answer any three of the following each question carries 3 marks. **(3×3=9)**

26) write the balanced equations in the manufacture of potassium dichromate from chromite ore.

27) (i) what is Lanthanide contraction ? and write the general oxidation state of actinides.

(ii) Between Cu^{+} and Cu^{+2} which is more stable.

28) Explain hybridization, geometry and magnetic property of ion$[Ni(CN)_4]^{-2}$ using valency bond theory.

29)1) write the IUPAC name of K_3 $[cr(C_2O_4)_3]$.

2)) Give the facial (fac)and maridional (mer) isomeric structure of $[Co(NH_3)_3(NO_2)_3]$.

30) 1) Draw the figure to show splitting of d - orbitals in Tetrahedralcomplex.

2) Among $[NiCl_4]^{-2}$ and $[Ni(CO)_4]$ which is diamagnetic though both are tetrhedral.

V. Answer any two of the following each question carries 3 marks **(2×3=6)**

31) (a) write any two differences between ideal and non ideal solution.

(b) How does the size of the blood cells change when placed in any aqueous solution containing more than 0.9% (m/v) sodium chloride.

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32) (a) state Faraday's first law of electrolysis.

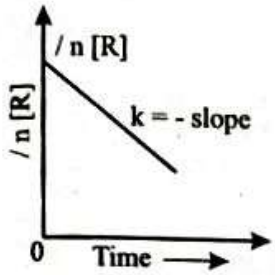
(b) which gas is evolved at cathode during the electrolysis of an aqueous solution of Nacl.

(c) How many Faraday of electricity is required to reduce 1 mole of MnO_4^{-1} to Mn^{+2}.

33) Draw neat labelled diagram of standard hydrogen electrode (SHE).Write its half cell reaction.

34) (a) Show that the half - life period of first order reaction is independent of initial concentration of reacting species.

(b) From the following graph mention order of a reaction .



PART- D

VI. Answer any four of the following each question carries 5 marks . **4×5= 20**

35) a) Explain the mechanism involved in the conversion of tertiary butyl Bromide in to tertiary butyl alchohal.

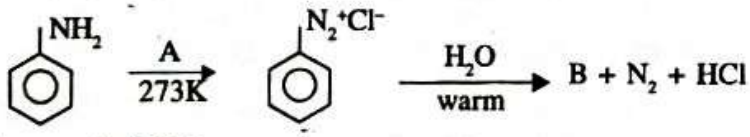
b) How do you prepare Toluene from Bromobenzene

36) a) Explain the mechanism of Acid catalysed dehydration of Ethanol to ethene.

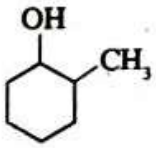
b) How do you convert phenol into salicylic acid by Kolbe's reaction.

37) a) what is Lucas reagent?. Which class alcohols does not produce turbidity with it at room temperature .

b) Identify A & B



c) name the IUPAC name of



38) a) How is aniline converted into phenyl isocyanide? write the equation.

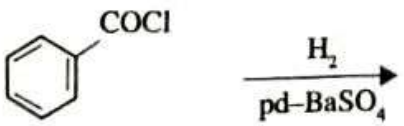
b) explain the coupling reaction of Benzene diazonium chloride with phenol write the equation.

c) Among 1^0 Aliphatic amine and 1^0 Aromatic amine which is not prepared by Gabriel phthalamide reaction.

39) a) Explain the mechanism of addition of HCN to a carbonyl group in presence of base.

b) Complete the following reaction.

1



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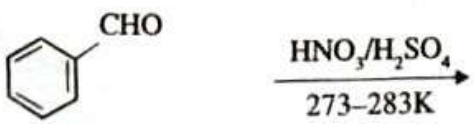

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(3) $RCH_2OH \xrightarrow[H3O+]{\text{Alkaline } KMnO4} _____$

40) (a)write Haworth structure of α - Maltose.

(b) Name naturally occurring optically inactive amino acid.

(c) Name any one vitamin that is stored in liver and adipose tissue.

PART - E(problems)

VII. Answer any three of the following each question carries 3 marks 3×3=9

41) 5.8 gram of non volatile salute was dissolved in 100gram of carbon disulphide(CS_2).The vapour pressure of the solution was found to be 190 mmHg. Calculate molar mass of the solute given the vapour pressure of the pure carbon disulphideis 195 mm Hg. (Molar mass of the carbon disulphide=76 gram/mole.)

42)300$cm^3$of an aqueous solution of proteins contains 2.12gram of the protein the Osmotic pressure of such a solution at 300 K is found to be3.89 ×10^{-3}bar. Calculate the molar mass of the protein(R =0.08231 bar/mole. K)

43) The electrical resistance of a column of 0.05mol/L NaoH solution of the diameter 1 cm and length 50 cm is5.55× 10^3 Ohm calculate its Resistivity and conductivity.

44) calculate the e.m.f of the cell in which the following reaction takes place E°cell =1.05V.

$$Ni + 2Ag^+ \longrightarrow Ni^{2+} + 2Ag$$

(0.002M) (0.160M)

45) A reaction is first order in A and a second order in B.

(i) write the differential rate equation.

(ii) How is rate affected on increasing the concentration of B by 3 times and decreasing in the concentration of A. by 2 times

(iii) How is the rate affected when the concentration of both A and B tripled.

46) The rate constants of reactions are 2×10^{-2} s^{-1} at 300K and 8 ×10^{-2} s^{-1} at 320 K. Calculate the energy of activation of the reaction (R =8.314J/K.mol).

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MD **II PUC PREPARATORY EXAMINATION, JANUARY - 2025** **II**

Time : 3:00 Hours | **CHEMISTRY - 34** | Max. Marks : 70

DISTRICT : MANDYA

Instructions : 1) Question paper have FIVE parts. All parts are compulsory.
2) a) Part-A carries 20 marks. Each question carries 1 mark. b) Part-B carries 06 marks. Each question carries 2 marks. c) Part-C carries 15 marks. Each question carries 3 marks. d) Part-D carries 20 marks. Each question carries 5 marks. e) Part-E carries 09 marks. Each question carries 3 marks.
3) In part-A questions first attempted answer will be considered for awarding marks.
4) Write balanced chemical equations and draw neat labelled diagrams and graphs wherever necessary.
5) Direct answers to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.
6) Use log tables and simple calculator if necessary. [use of scientific calculator is not allowed]
7) For a question having circuit diagram/figure/graph/diagram, alternate questions are given at the end of question paper in a separate section for visually challenged students.

PART - A

I Select the correct option from the given choices. **1×15 = 15**

1) The concentration term depends on temperature is
a) molality b) mole fraction c) molarity d) ppm

2) The values of K_H for O_2, N_2 and He are respectively 1.8×10^{-4} bar^{-1}, 4.48×10^{-4} bar^{-1} and 6.8×10^{-4} bar^{-1}. Hence the order of their solubility in water will be
a) $He > N_2 > O_2$ b) $O_2 > N_2 > He$ c) $N_2 > He > O_2$ d) $He > O_2 > N_2$

3) The quantity of electric charge required to reduce one mole of $Cr_2O_7^{2-}$ to Cr^{3+}
a) 3F b) 2F c) 6F d) 5F

4) Statement I : If in a zero order reaction, the concentration of the reactant is doubled, the half life period is also doubled.
Statement II : For a zero order reaction, the rate of reaction is independent of initial concentration.
a) Both statement-I and II are correct b) Both statement-I and II are incorrect
c) Statement-I is correct but statement-II is incorrect d) Statement-I is incorrect but statement-II is correct

5) The maximum magnetic moment is shown by the ion having the d-orbital electronic configuration
a) $3d^8$ b) $3d^6$ c) $3d^9$ d) $3d^5$

6) The coordination number and oxidation number of 'x' in the following compound $[X(SO_4)(NH_3)_5]Cl$ will be
a) 2 and 6 b) 6 and 3 c) 6 and 4 d) 10 and 3

7) The chemical formula of phosgene is
a) $SOCl_2$ b) CH_2CL_2 c) $COCl_2$ d) CCl_4

8) Among the following alkyl halides which is more reactive towards SN^2 reaction?
a) R-I b) R-Cl c) R-F d) R-Br

9) The least basic among the following NH_3, CH_3NH_2 and $C_6H_5NH_2$ is
a) NH_3 b) $C_6H_5NH_2$ c) CH_3NH_2 d) all are equally basic

10) By which test 1°, 2° and 3° alcohols be detected?
a) Hinsberg test b) Tollen's test c) Lucas test d) All of these

11) Salicylaldehyde can be prepared by
a) Finkelstein reaction b) Dow's process c) Reimer-Tiemann reaction d) Kolbe's reaction

12) The carbon atom of the Carbonyl group is
a) sp^3 b) dsp^2 c) sp d) sp^2

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13) Which of the following compound will react with Tollen's reagent?
a) CH_3CHO b) CH_3COOH c) CH_3COCH_3 d) $CH_3CH_2CH_3$

14) Match the following given in List-I with List-II.

List - I	List - II
i) Vitamin - A	A) Scurvy (Bleeding gums)
ii) Vitami - B_{12}	B) Increased blood clotting level
iii) Vitamin - K	C) Pernicious anaemia
iv) Vitamin - C	D) Xerophthalmia

a) i-D, ii-A iii-C iv-D b) i-D, ii-C, iii-B, iv-A c) i-A, ii-B, iii-C iv-D d) i-C, ii-D, iii-A, iv-B

15) Nucleotides are joined together by
a) peptidebonds b) Glycosidic Linkage c) Phaphodiester Linkage d) Disulphide bonds

II Fill in the blanks by choosing the appropriate word from those given in the bracket. 5×1=5

[HNO_2 +2 Cellulose acetate Phenol +3 CN^-]

16) A semipermeable membrane used in reverse osmosis is _____.

17) The common oxidation state of Lanthanide series elements is _____.

18) The simplest hydroxy derivative of benzene is _____.

19) _____ is an ambidentate Ligand.

20) Primary aliphatic amines convert into aliphatic alcohols on heating with _____.

PART - B

III Answer any THREE of the following. Each question carries two marks. 3×2=6

21) Define collision frequency. Mention any one factor which is responsible for effective collision.

22) Give reasons :
a) Cerium (Ce) exhibits '+4' oxidation state.
b) Atomic size of 4d and 5d series elements ae almost same

23) Explain Fitting's reaction.

24) How do you prepare methoxymethane by Williamson's synthesis? Give the equation.

25) What are hormones? Name a hormone which regulate blood sugar level in the human body.

PART - C

IV Answer any THREE of the following. Each question carries three marks. 3×3=9

26a) Transistion metals form large number of complex compounds. Give two reasons.
b) What are interstitial compounds?

27) Write the balanced chemical equations involved in the manufacture of $K_2Cr_2O_7$ from chromite ore.

28a) What is spectrochemical series? 1+2
b) Draw the Cis and trans isomers of $\left[Fe(NH_3)_2(CN)_4\right]^-$.

29) Using VBT, explain the geometry, hybridisation and magnetic property of $\left[Ni(CN)_4\right]^{2-}$ ion $(Z = 28)$

30a) What are homoleptic complexes? Give an example. 2+1
b) Write the IUPAC name of $K_4\left[Fe(CN)_6\right]$

V Answer any TWO of the following. Each question carries three marks. 2×3=6

31) a) What are azeotropes? Which type of azeoropes form solutions showing a large positive deviation from Raoult's Law.
b) Define Hypertonic solution.

32) Draw a neat labelled diagram of SHE. Write its half cell reaction and E° value.

33) What is corrosion? Write the anodic and cathodic reactions that taking place in rusting of iron.

34) Derive an expression for rate constant of a zero order reaction.

PART - D

VI Answer any FOUR of the following. Each question carries five marks. 4×5=

35) a) Complete the following equation.

i)  $\xrightarrow[H_2O]{Warm}$

ii) $C_6H_5Br + Mg \xrightarrow{dry\ ether}$

b) Write the steps involved in SN^1 mechanism during the conversion of tertiary butyl bromide into tertiary butyl alcohol.

36) a) Write the mechanism involved in the acid catalysed dehydration of ethanol to ethene.
b) How do you prepare phenol by cumene process? Give the equation.

37) a) Between methanol and ethanol, which would undergoes aldol condensation? Write the chemical reaction involved in it.
b) Aldehydes are generally more reactive than ketones towards nucleophilic addition reactions. Give any two reasons.

38) a) Explain nitration of benzoic acid. Write the equation.
b) What is the effect of $-CH_3$ and $-NO_2$ group on the acidity of carboxylic acids?
c) Name the reagent used in clemmenson reduction. 2

39) a) Explain the preparation of methanamine by Hoffmann bromamide degradation reaction.
b) How is aniline converted to benzene diazonium chloride? Give the equation.
c) Write the chemical formula of Hinsberg's reagent. 2

40) a) What is peptide bond? How many peptide bonds are present in pentapeptide?
b) Write Haworth structure of maltose.
c) Name the protein present in hair.

PART - E
(NUMERICAL PROBLEMS)

VII Answer any THREE of the following. Each question carries three marks. 3

41) The boiling point of benzene is 353.23K. When 1.8g of non-volatile, non-electrolyte solute was dissolved in 90g of benzene, the boiling point is raised to 354.11K. Calculate the molar mass of the solute (Given Kb for benzene is 2.53K $kg.mol^{-1}$)

42) Calculate the osmotic pressure in pascals exerted by a solution prepared dissolving 1.0g of polymer of molar mass 185000 in 450 ml of H_2O at 37° C (R= 0.0821 L. atm $K^{-1}.mol^{-1}$) (1 atm = 101325 pascals).

43) $\wedge^{\circ}m$ for NaCl, HCl and NaAC are 126.4, 425.9 and 91.0 $S.Cm^2\ mol^{-1}$ respectively. Calculate $\wedge^{\circ}$ (molar conductance) for HAC.

44) Calculate the equilibrium constant of the reaction.

$$Cu_{(s)} + 2Ag^{+}_{(aq)} \rightarrow Cu^{2+}_{(aq)} + 2Ag_{(s)} \text{ Given } E^{\circ}_{cell} = 0.46V$$

45) A first order reaction has a rate constant $1.15\times10^{-3}\ S^{-1}$. How long will 5g of this reactant take to reduce to 3g

46) The rate constant of a reaction is doubled when the temperature is increased from 400K to 410K. Calculate the energy of activation (Ea). (Given R=8.314 J/K/mol.)

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SECOND PUC PREPARATORY EXAMINATION JAN-2025

SUBJECT: CHEMISTRY

Time : 3.00 hrs **Max. marks: 70**

DISTRICT : MYSURU

1. Question paper has FIVE parts. All parts are compulsory.
2. a. Part-A carries 20 marks. Each question carries 1 mark.
   b. Part-B carries 06 marks. Each question carries 2 marks.
   c. Part-C carries 15 marks. Each question carries 3 marks.
   d. Part-D carries 20 marks. Each question carries 5 marks.
   e. Part-E carries 09 marks. Each question carries 3 marks.
3. In Part- A questions, **first attempted answer** will be considered for awarding marks.
4. Write balanced chemical equations and draw neat labeled diagrams and graphs wherever necessary.
5. Direct answers to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.
6. Use log tables and simple calculator if necessary (use of scientific calculator is not allowed).

PART-A

I. Select the correct option from the given choices. **15 ×1= 15**

1. The magnetic moment of an element is 1.73 BM. The number of unpaired electrons in it is
   a) 2 b) 3 c) 1 d) 0

2. The chlorine containing antibiotic produced by microorganisms which is very effective for the treatment of typhoid fever is
   a) chloramphenicol b) thyroxine c) chloroquine d) Chlorophenol

3. Sucrose on hydrolysis produces
   a) Leavorotatory glucose and dextrorotatory fructose
   b) Leavorotatory fructose and dextrorotatory glucose
   c) Racemic mixture
   d) Leavorotatory glucose and leavorotatory fructose

4. The most diluted solution is (molar mass of NaCl = 58.5 g mol^{-1})
   a) 2% (w/w) NaCl in water b) 1M NaCl c) 2 ppm of NaCl d) 2 m NaCl

5. **Statement I** : Conductivity (κ) of a solution decreases with dilution.
   Statement II : Molar conductivity (λ_m) of solution increases with dilution .
   Identify the correct statement
   a. Both the statements I and II are correct
   b. Both the statements I and II are incorrect
   c. Statement I is correct and statement II is incorrect.
   d. Statement I is in correct and statement II is correct.

6. A Compound P with formula C_3H_6 on reaction with H_2O in presence of H_2SO_4 gives the compound Q. Compound Q on heating with Cu at 573K produces the compound R. Compounds P, Q and R are
   a) P= propan-1-ol Q = propene, R = propanone.
   b) P= propene, Q = propan-2-ol, R = propene.
   c) P= propene, Q = propan-2-ol, R = propanone.
   d) P= propanone, Q = propan-1-ol, R = propane.

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7. For a reaction of the type, R ⟶ P, Identify the equation for a I order reaction
a) $+ d[R]/dt = k$ b) $t_{1/2} = [R_0]/2k$ c) $t_{1/2} \alpha [R]_0$ d) $[R] = [R]_0 e^{-kt}$

8. Identify the correct match with respect to the properties mentioned with it.
a) Solubility in water: $CH_3OH > C_5H_{11}OH$
b) Boiling Point: $C_4H_{10} > C_4H_9OH$
c) Acidic nature: o-cresol > phenol
d) Reactivity with Lucas reagent: $CH_3OH > (CH_3)_3C\text{-}OH$

9. An example for ambidentate ligand is
a) CO b) CN^- c) NO_3^- d) SO_4^{2-}

10. The bond between CO and metal in metal carbonyl is stronger due to
a) Synergic effect b) Chelating effect
c) only σ bond effect d) Ambidentate nature of CO ligand.

11. Match the list -I with the list- II

List -I	List-II
A) Rosenmund reaction	i) Oxidation of Toluene
B) Etard reaction	ii) Disproportionation reaction
C) Cannizzaro reaction	iii) Reduction of Acid Chloride

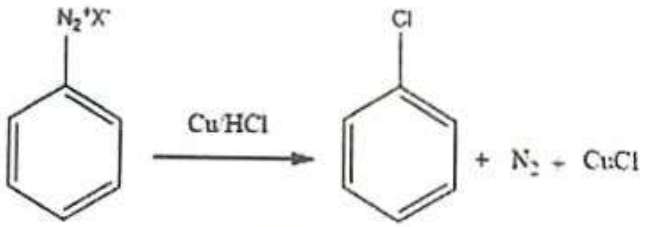
a) A) – i B) – ii C) – iii b) A) – iii B) – i C) – ii
c) A) – ii B) – iii C) – I d) A) – iii B) – ii C) – i

12. The compound which does not give positive test for Fehling's solution is
a) CH_3CHO b) C_6H_5CHO c) $CH_3CH_2\ CH_2CHO$ d) $CH_3\ CH_2CHO$

13. The S.I. unit of rate constant of a first order reaction is
a) s^{-1} b) mol dm^{-3} c) mol $dm^{-3}\ s^{-1}$ d) $mol^{-1}\ dm^3\ s^{-1}$

14. Zwitter ion of aniline is formed in
a) Bromination reaction b) Sulphonation reaction
c) Carbylamine reaction. d) Sandmeyer's reaction.

15. The name of given reaction is



a) Sandmeyer reaction b) Gatterman reaction
c) Gatterman -Koch reaction d) Diazotisation reaction

II. Fill in the blanks by choosing the appropriate word from those given in the brackets:
(bronze, activation energy, anisole, chloroform, vitamin- B12, Vitamin-B2) $5 \times 1 = 05$

16. The factor that affects the rate of a reaction is _____.
17. The methyl phenyl ether is _____
18. The water soluble vitamin that is stored in human body is _____
19. A polyhaloalkane is _____.
20. An alloy containing tin is_____.

PART – B

III. Answer any three of the following. Each question carries two marks. **3 × 2 = 06**

21. What is lanthanoid contraction? Mention one of its consequences.
22. Explain Swarts reaction with a suitable chemical equation.
23. Write the expression to relate cryoscopic constant and change in enthalpy of fusion. Explain the terms involved in it.
24. Name the two types of glycosidic linkages present in Amylopectin.
25. Write the chemical equation for the conversion of sodium phenate to salicylaldehyde. Name the reaction.

PART - C

IV. Answer any three of the following. Each question carries three marks. **3 × 3 = 09**

26. Write the structures of geometrical isomers of $[Co(en)_2Cl_2]^+$. Which isomer of this is optically active?
27. Using VBT, explain hybridisation, geometry and magnetic property of $[NiCl_4]^{2-}$ complex. (atomic number of Ni is 28).
28. Give the equations for the preparation of potassium dichromate from chromite ore.
29. Draw the energy level diagram for the crystal field splitting in octahedral complexes. Write the relation between Δ_0 and Δ_t for the complexes having same metal, the same ligand and metal-ligand distances.
30. Classify the following compounds into acidic, basic and amphoteric oxides: Cr_2O_3, CrO_3 and CrO.

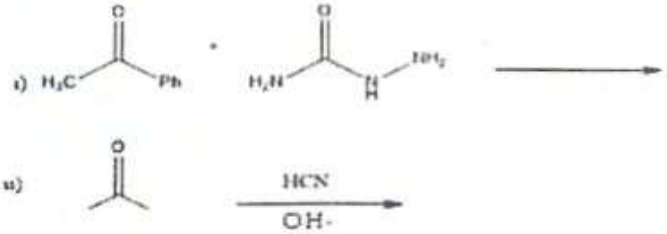
V. Answer any two of the following. Each question carries three marks. **2 × 3 = 06.**

31. Derive integrated rate equation for a first order reaction.
32. State Kohlrausch's law of independent migration of ions. Write its Mathematical form. Mention one of its applications.
33. Which method has the advantage over other colligative methods for the measurement of molar mass of proteins and polymers? Give any two reasons.
34. In lead storage battery, a) mention the electrolyte used.
    b) Write the reaction that occurs at i) anode ii) cathode

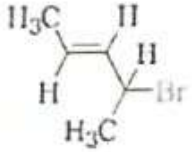
PART - D

VI. Answer any four of the following. Each question carries five marks. **4 × 5 = 20**

35. **a)** Among acetaldehyde and benzaldehyde which one undergo Cannizzaro reaction? Write their products of Cannizzaro reaction.
    b) Complete the following reactions.



36 a) Explain the steps involved in S_N1 mechanism for the hydrolysis of t-butyl bromide.
   b) Between allyl bromide and bromomethane, which one proceeds faster by S_N1 mechanism?
   c) Write the IUPAC name of the following compounds.



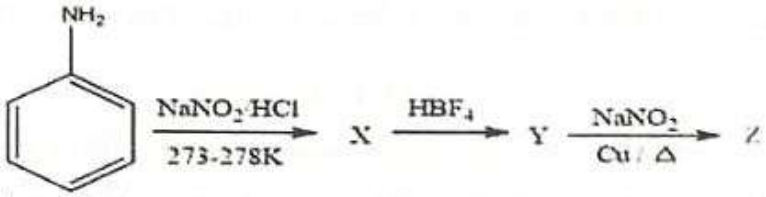
i)

ii) $CH_3CH_2CH(CH_3)CH_2Br$

37. a) Write the steps involved in the conversion of ethanol to ethoxy ethane.
    b) Give the chemical equations for the conversion of cumene into phenol.

38. a) What are hormones? Name the hormone responsible for preparing the uterus for implantation of fertilized egg.
b) Write the general formula for alpha amino acid. Give an example for optically inactive non-essential amino acid.
c) Mention the components of a nucleoside?

39. a) Identify X, Y, Z



b) Name any one biologically active amino acid compound used in the following:
i) To increase blood pressure ii) as an anaesthetic in dentistry.

40. a) A Grignard reagent 'X' reacts with CO_2 (dry ice) followed by acid hydrolysis gives propanoic acid. Write the chemical equation. Name the compound 'X'.
b) Write the product obtained when acetic acid reacts with P_2O_5. Give its chemical reaction.

PART – E

(NUMERICAL PROBLEMS)

VII. Answer **any three** of the following. Each question carries **three** marks. **3 × 3 = 09**

41) Represent the cell in which the following reaction takes place
$Mg_{(s)} + 2Ag^{+}_{(0.0001M)} \longrightarrow Mg^{2+}_{(0.130M)} + 2Ag_{(s)}$. Calculate the emf of the cell at 298 K.

42) 200 cm^3 of an aqueous solution of a protein contains 1.26 g of the protein. The osmotic pressure of such a solution at 300 K is found to be 2.57×10^{-3} bar. Calculate the molar mass of the protein. ($R=0.083$ L bar mol^{-1} K^{-1})

43) Show that in a first order reaction, time required for completion of 99.9% is 10 times of half-life ($t_{1/2}$) of the reaction.

44) The resistance of a conductivity cell filled with 0.02M KCl solution is found to be 520 Ω, calculate molar conductivity of solution. (cell constant of a cell is 129 m^{-1}).

45) Calculate the mole fraction of benzene (C_6H_6) in a solution containing 30% by mass in carbon tetrachloride (CCl_4). [*molar mass of benzene is 78g/mol and molar mass of benzene is 154g/mol*]

46) The rate constant for the first order decomposition of H_2O_2 is given by the following equation:
$\log_{10} k = 14.34 - 1/T\ (1.25 \times 10^4)$
Calculate E_a for this reaction ($R = 8.314$ $JK^{-1}mol^{-1}$)

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Collection Of Question Papers For POCKET MARKS 70/70

GOVERNMENT OF KARNATAKA Register Number : ☐☐☐☐☐☐

DEPUTY DIRECTOR, DEPT. OF SCHOOL EDUCATION (PRE-UNIVERSITY)

PUC-II YEAR PREPARATORY EXAMINATION-2025

Time : 3 Hours SUBJECT : CHEMISTRY (34) MARKS : 70

Instructions : 1) The question paper has five parts. A, B, C, D & E. All parts are compulsory.

2) a) PART-A Carries 20 marks, Each question carries 1 mark. b) PART-B Carries 06 marks, Each question carries 2 marks, c) PART-C Carries 15 marks, Each question carries 3 marks, d) PART-D Carries 20 marks, Each question carries 5 marks. e) PART-E carries 9 marks. Each question carries 3 marks.

3) In Part A questions, first attempted answers will be considered for awarding marks.

4) Write balanced chemical equations and draw neat labelled diagrams and graphs wherever required.

5) Direct answers to numerical problems without detailed steps and specific unit for final answer will not carry any marks.

6) Use log tables and the simple calculators if necessary. (Use of scientific calculator is not allowed)

PART - A

DISTRICT : RAICHURU

I. Select the correct option from the given choices : 15X1=15

1) The central metal atoms/ ions in the co-ordination compounds are also called as
   a) Lewis bases b) Bronsted acids c) Bronsted bases d) Lewis acids

2) The order of a chemical reaction having rate expression, Rate=k[A] [B] is
   a) 1 b) 2 c) 1/2 d) 1/4

3) Statement I : Allylic alcohols have — OH group linked to a sp^3 hybridised C next to the C=C double bond.
   Statement II : Benzylic alcohols have –OH group is linked to a sp^3 hybridised C-atom next to aromatic ring.
   Identify the correct statement
   a) Both statement I and II are correct
   b) Both statement I and II are incorrect
   c) Statement I is correct and statement II is incorrect
   d) Statement I is incorrect and statement II is correct

4) Which of the following solution is used as an anti-freezing agent in car radiators to cool the engine
   a) 35% (v/v) solution of ethylene glycol
   b) 35% (m/m) solution of ethylene glycol
   c) 35% (m/v) solution of ethylene glycol
   d) 35% (v/m) solution of ethylene glycol

5) Halogenation of benzene occurs in the presence of Lewis acid but halogenation of phenol occurs even in the absence of Lewis acid due to
   a) Highly deactivating effect of –OH group attached to the benzene ring
   b) Highly activating effect of –OH group attached to the benzene ring
   c) Highly deactivating effect of the benzene ring
   d) Highly activating effect of the benzene ring

6) What will happen in the Daniel cell, when $E_{ext} < 1.1$ V ?
   a) Electrons flow from Zn rod to Cu rod hence current flows from Cu to Zn
   b) Electrons flow from Cu rod to Zn rod hence current flows from Cu to Zn
   c) Electrons flow from Zn rod to Cu rod hence current flows from Zn to Cu
   d) Electrons flow from Cu rod to Zn rod hence current from Zn to Cu

(P.T.O)

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7) The C=O bond in carbonyl compounds is polarised due to high electronegativity of O than C in the carbonyl group and hence
a) carbonyl carbon is an electrophilic & carbonyl oxygen is a nucleophilic centre
b) carbonyl carbon acts as a Lewis acid & carbonyl oxygen acts as a Lewis base
c) Both (a) & (b)
d) None of the above

8) In zwitter ionic form, amino acids show
a) acidic behaviour
b) amphoteric behaviour
c) basic behaviour
d) both acidic & basic behaviour

9) The boiling points of alcohols increase with
a) increase in the number of C-atoms
b) decrease in van der Waals forces
c) increase of branching in C-chain
d) decrease in surface area of C-chain

10) Compounds NO and O_2 react according to the chemical equation $2NO(g) + O_2(g) \longrightarrow 2NO_2(g)$. The concentration of either NO or O_2 were changed by keeping the concentrations of one of the reactants constant and the rates were measured as a function of initial concentration. Following results were obtained. Choose the correct option for the rate equation for this reaction.

Experiment	Initial [NO]/mol L^{-1}	Initial [O_2]/mol L^{-1}	Initial rate of formation of NO_2/mol $L^{-1}s^{-1}$
1.	0.30	0.30	0.096
2.	0.60	0.30	0.384
3.	0.30	0.60	0.192
4.	0.60	0.60	0.768

a) Rate=k[NO]^2 b) Rate=k[NO]^2 [O]^2 c) Rate=k[NO] [O_2] d) Rate=k[NO]^2 [O_2]

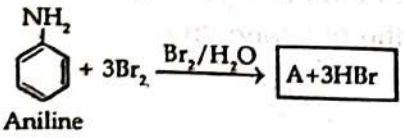
11) The reagent used for the selective reduction of nitriles to imines which on hydrolysis give aldehydes is
a) $SnCl_2$ and HCl b) $AlH(i\text{-}Bu)_2$ c) CrO_2Cl_2 d) CO and HCl

12) Match the following given in column I with Column II

Column I	Column II
i) Dichloromethane	A) fire extinguisher
ii) Trichloro-methane	B) antiseptic
iii) Triiodo-methane	C) solvent for fats
iv) Tetrachloro-methane	D) paint remover

a) i - C, ii-D, iii-B, iv-A
B) i - D, ii-C, iii-B, iv-A
C) i - D, ii-B, iii-C, iv-A
D) i - A, ii-B, iii-C, iv-D

13) The product 'A' formed in the following reaction is



a) 2,4,6- Tribromoaniline
b) 1,2,3-Tribromoaniline
c) 1,3,5-Tribromoaniline
d) 1,4,6-Tribromoaniline

14) If $\Delta_0 < P$ (Pairing energy), for d^4 ion, an entry of the 4th electron gives the configuration
a) $t^2{}_{2g}e^2g$ b) $t^4{}_{2g}e^0g$ c) $t^4{}_{2g}e^0g$ d) $t^3{}_{2g}e^1g$

15) The correct order of magnetic moment is
a) $Sc^{3+} < Ti^{3+} < Tl^{2+}$ b) $Ti^{3+} < Tl^{2+} < Sc^{3+}$ c) $Tl^{2+} < Sc^{3+} < Ti^{3+}$ d) $Sc^{3+} < Tl^{3+} < Ti^{3+}$

II. Fill in the blanks by choosing the appropriate word from those given in brackets : 5X1=5
(pyridoxine, lactose, catalyst, Lewis bases, methanol, ethane)

16) The disaccharide present in milk is .....
17) The chemical name of vitamin B_6 is .....
18) Due to the presence of unshared e^- pair on N-atom, amines behave as .....
19) Nowadays, large quantities of ethanol are obtained by hydration of .....
20) The substance which helps in attaining an equilibrium faster during a chemical reaction is .....

PART-B

III. **Answer ANY THREE of the following. Each question carries two marks.** 3X2=6

21) Draw a graph to show the depression in the freezing point of a solvent in a solution.
22) Explain the Friedel-Craft's acylation of anisole with equation.
23) What is denticity of a ligand ? Give an example of a coordination entity.
24) Alcohols act as Lewis bases and Bronsted bases as well. Give reasons.
25) Which causes hypothyroidism ? How to control it ?

PART-C

IV. **Answer ANY THREE of the following. Each question carries three marks.** 3X3=9

26) Write the equations for the preparation of potassium permanganate from pyrolusite ore. What is the colour of $KMnO_4$ crystals ?
27) What are metal carbonyls ? How are the sigma and pi bonds formed in metal carbonyls ?
28) Give reason for the following : a) The stability of $Cu^{2+}(aq)$ ion is greater than $Cu^{+}(aq)$ ion.
b) Cr^{2+} is reducing in nature.
c) Oxidation state of Ni is zero in the complex, $Ni(CO)_4$.
29) Define the terms : a) pairing energy
b) spectrochemical series c) coordination sphere
30) What is transition element ? Scandium is a transition element but not the zinc. Why ?

V. **Answer ANY TWO of the following. Each questions carries three marks.** 2X3=6

31) What does P and Z_{AB} represent in the equation : $Rate=PZ_{AB}\, e^{-Ea/RT}$? Name a factor on which Z depends.
32) Direct measurement of conductivity of ionic solutions by Wheatstone bridge is not possible. Give reasons. Suggest a remedy to resolve it.
33) Give reason for the following :
a) Pressure does not have any significant effect on the solubility of solids in liquids.
b) It is not possible to separate the components of azeotropes by fractional distillation.
c) Osmotic pressure is a colligative property
34) What are secondary cells ? Write the reactions occurring at anode and cathode in lead acid battery.

PART-D

VI. **Answer ANY FOUR of the following. Each questions carries five marks.** 4X5=20

35) a) What are anomers ? Give an example of ketose sugar.
b) What is zwitter ion ? All naturally occurring α-amino acids except glycine are optically active and why ?
c) Name the enzyme that hydrolyses sucrose. (2+2+1)

(P.T.O)

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36) a) How is the benzene converted into benzaldehyde using CO and HCl ? Name the reaction.
b) Aldehydes are more reactive than ketones. Give two reasons.
c) Expand DIBAL-H. (2+2+1)

37) a) Explain acylation reaction of amines with an example. Mention the role of pyridine in this reaction.
b) Explain Gatterman reaction with an example. (3+2)

38) a) An acid 'X' reacts with ammonia to give 'Y' which on heating at high temperature gives acetamide. Write the chemical equation. Name the compounds 'X' and 'Y'.
b) How the presence of carboxyl group in an organic compound is detected ? Give general reaction. (3+2)

39) a) An aromatic hydrocarbon having molecular formula C_6H_5OH on treating with NaOH gives 'A' which on treatment with CO_2 followed by acid treatment gives the compound 'B'. Write the chemical reaction and the names of A and B.
b) Give reason for the following :
i) Alkyl aryl ethers are cleaved at the alkyl-oxygen bond.
ii) In case of anisole, bond between O-CH_3 is weaker than the bond between O-C_6H_5. (3+2)

40) a) Write the mechanism involved in the S_N2 reaction. Mention the order and configuration of the product.
b) Mention one similar and one dissimilar property of enantiomers. (3+2)

PART-E
(NUMERICAL PROBLEMS)

VII. Answer ANY THREE of the following. Each questions carries three marks. 3X3=9

41) Calculate the molarity of 2.5 g of ethanoic acid (CH_3COOH) in 75 g of benzene.

42) The Boiling point of benzene is 353.23K, when 1.8g of non-volatile solute was dissolved in 90 g of benzene, the boiling point is raised to 354.11K. Calculate the molar mass of solute. K_b for benzene is 2.53 Kkg/mol^{-1}.

43) Calculate the equilibrium constant of the reaction : $Cu(s) + 2Ag^+(aq) \rightarrow Cu^{2+}(aq) + 2Ag(s)$. $[E^\circ_{cell}=0.46V]$

44) The conductivity of 0.001028 mol L^{-1} acetic acid is 4.95×10^{-5} Scm^{-1}. Calculate its disscociation constant if E°_m for acetic acid is 390.5 Scm^2mol^{-1}.

45) Show that in a first order reaction, time required for completion of 99.9% is 10 times of half-life ($t_{1/2}$) of the reaction.

46) The first order rate constant for the decomposition of ethyl iodide at 600 K is 1.6×10^{-5} s^{-1}. Its energy of activation is 209 kJ/mol. Calculate the rate of the reaction at 700 K.

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RD

II PUC PREPARATORY EXAMINATION, JANUARY - 2025

II

Time : 3 Hours | CHEMISTRY - 34 | Max. Marks : 70

DISTRICT : RAMANAGARA

INSTRUCTION :

1. *Question paper has five parts. All parts are compulsory.*
2. *a) Part-A carries 20 marks. Each question carries 1 mark. (b) Part-B carries 06 marks. Each question carries 2 marks. (c) Part-C carries 15 marks. Each question carries 3 marks. (d) Part-D carries 20 marks. Each question carries 5 marks. (e) Part-E carries 09 marks. Each question carries 3 marks.*
3. *In Part-A questions, first attempted answer will be considered for awarding marks.*
4. *Write balanced chemical equations and draw neat labelled diagrams and graphs wherever necessary.*
5. *Direct answers to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.*
6. *Use log tables and simple calculator if necessary (use of scientific calculator is not allowed)*
7. *For a question having circuit diagram/figure/graph/diagram, alternate questions are given at the end of question paper in a separate section for visually challenged students.*

PART A

I Select the correct option from the given choices: 15×1=15

1) Of the complex $\left[Ni(NH_3)_5\,Br\right]Cl$ the ionisation isomer will give colour with
   a) White b) Red c) Yellow d) Blue

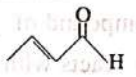
2)
   a) Increases b) Decreases c) No change d) First increases, then decreases

3) Statement I : Galvanised iron does not rust.
   Statement II : Zinc has more negative electrode potential than iron
   a) Both statement I and II are correct b) Both statement I and II are incorrect
   c) Statement I is correct and II is incorrect d) Statement I is incorrect and II is correct

4) Which of the following is an example of a solid solution?
   a) Copper dissolved in gold b) Ethanol dissolved in water
   c) Glucose dissolved in water d) Sodium chloride dissolved in water

5) C-Cl bond of chlorobenzene in comparision to C-Cl bond in methylchloride is
   a) Longer and weaker b) Shorter and weaker c) Shorter and stronger d) Longer and stronger

6) Among the following ethers, which one will produce methyl alcohol on treatment with hot conc. HI?
   a) $CH_3-CH_2-\underset{\displaystyle CH_3}{\overset{\displaystyle |}{CH}}-O-CH_3$ b) $CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-O-CH_3$ c) $CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle |}{CH}}-CH_2-O-CH_3$
   d) $CH_3-CH_2-CH_2-CH_2-O-CH_3$

7) Which of the following compound does not react with Tollen's reagent?
   a)  b)  c)  d) 

8) Which of the following alcohols reacts fastest with Conc.HCl and $ZnCl_2$?
   a) Pentan - 1 - Ol b) 2 - methylbutan - 1 - Ol c) Pentan - 2 - Ol d) 2 - methylbutan - 2 - Ol

9) In the reaction, $H_2O_2 + 2H^+ + 3I^- \rightarrow I_3^- + 2H_2O$
   Select the correct statement.
   a) Rate of disappearance of H_2O_2 will be three times the rate of disappearance of I^-.
   b) Rate of disappearance of H_2O_2 is $\frac{1}{3}$ of rate of formation of I_3^-.
   c) Rate of disappearance of I^- ions will be three times the rate of formation of I_3^- ions.
   d) Rate of formation of H_2O is $\frac{1}{2}$ of rate of formation of I_3^-.

(P.T.O.)

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10) One having highest melting point is,

a) 

b) 

c) 

d) $H_3C-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2-CH_3$

11) In data given below

Sl.No.	A mol/L	B mol/L	Rate mol L^{-1} s^{-1}
1)	0.02	1.2	3.0×10^{-3}

The reaction may be

a) First order b) Second order c) Pseudo second order d) 2nd order with respect to A

12) Match the following given in column I with column II.

Column I	Column II
i) Estradiol	A) Mediate responses to external stimuli
ii) Thyroxine	B) Regulate the glucose level in the blood
iii) Epinephrine	C) Responsible for development of secondary female characteristics
iv) Glucagon	D) Goiter

a) i-C ii-D iii-A iv-B b) i-D ii-A iii-B iv-C c) i-B ii-D iii-C iv-A d) i-A ii-B iii-C iv-D

13) Diazo-coupling is useful to prepare some

a) Dyes b) Vitamins c) Pesticides d) Proteins

14) Which of the following statements about the interstitial compound is incorrect?

a) They are chemically reactive b) They retain metallic conductivity

c) They are much harder than pure metal d) They have higher melting point than pure metal

15) The sum of co-ordination number and oxidation number of the metal 'M' in the complex $\left[M(en)_2(C_2O_4)\right]Cl$ (where en is ethylenediamine) is

a) 7 b) 8 c) 9 d) 6

II Fill in the blanks by choosing the appropriate word from those given in the brackets: 5×1=5

$\left(C_6H_5OCH_3,\ \text{Cobalt},\ [Fe(CO)_5],\ CrO_2Cl_2,\ C_6H_5N_2^+Cl^-,\ \left[Fe(CH_3)_2\right]\right)$

16) Synergic bonding is involved in the compound _____.

17) The chemical formula of Anisole is _____.

18) The reagent used in Etard's reaction is _____.

19) Vitamin B_{12} is a co-ordination compound of _____ metal.

20) The product formed when aniline reacts with $NaNO_2$ and HCl at 273-278 K is _____.

PART - B

III Answer any THREE of the following. Each question carries two marks. 3×2=6

21) Give reason

a) Dry raisins swell when placed in water

b) The 'i' value for aq-KCl is more than ethanol in benzene.

22) Write the chemical reaction for Kolbe's reaction.

23) Write two differences between double salt and a complex salt.

24) Explain swarts reaction with an example.

25) What are essential amino acids. Give an example.

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PART - C

IV Answer any THREE of the following. Each question carries three marks. 3×3=9

26) Describe the process of preparation of potassium dichromate from chromite ore.

27) Using VBT, account for the geometry, hybridization and magnetic property of $\left[CO(NH_3)_6\right]^{3+}$

28) Why do transition elements form complex compounds. Give three reasons.

29) a) What type of isomerism is shown by the complex $\left[CO(NH_3)_5(SCN)\right]^{2+}$

b) On the basis of crystal feild theory, write the electronic configuration of d^4 ion of Δ_o>P.

c) Why are low spin tetrahedral complexes rarely observed?

30) a) Study of actinoid elements is difficult. Give two reasons.

b) Actinoid contraction is greater from element to element than lanthenoid contraction. Why?

V Answer any TWO of the following. Each question carries three marks. 2×3=6

31) Derive integrated rate equation for a first order reaction.

32) Define conductivity and molar conductivity for the solution of an electrolyte. How does molar conductivity varies with concentration for a weak electrolyte?

33) State Henry's law. Mention any two applications of Henry's law.

34) Explain the construction of SHE with a neat labelled diagram along with cell representation.

PART - D

VI Answer any FOUR of the following. Each question carries five marks. 4×5=20

35) a) How do you convert benzoic acid to benzamide? Write equation.

b) $\overset{\diagdown}{\underset{\diagup}{C}}=O \xrightarrow[HCl]{Zn-Hg} ----+----$

Complete the above reaction and give its name.

c) What is the necessary condition required for aldehydes and ketones to undergo Aldol condensation.

36) a) Write the mechanism involved in the conversion of 2-bromo-2-methylpropane to 2-methyl propan-2-ol.

b) Aryl holides are less reactive towards nucleophilic substitution compared to alkyl holides. Give two reasons.

37) a) Write the mechanism for acid catalysed hydration of ethene to ethanol.

b) Write the IUPAC name of $CH_3-\underset{CH_3}{\overset{|}{C}}=\underset{Br}{\overset{|}{C}}-CH_2OH$

c) Arrange the following compounds in increasing order of their acid strength
3-nitrophenol, propan-1-ol, phenol, 4-methylphenol.

38) a) Write Haworth structure of lactose.

b) What is denaturation of protein? Give an example.

c) Give an example for a water insoluble protein.

39) a) Two moles of organic compound 'A' on treatment with a strong base gives two compounds 'B' and 'C'. Compound 'B' on dehydration with Cu gives 'A', while acidification of 'C' yeilds carboxylic acid 'D' with molecular formula of CH_2O_2. Identify the compounds A, B, C and D.

d) Write the reaction for Hell-Volhard-Zelinsky reaction.

40) a) Write the chemical name and structure of Hinsberg's reagent.
Tertiary amines does not react with Hinsberg reagent. Give reasons.

b) Explain Hoffmann bromamide degradation reaction by taking butanamide as an example.

PART - E (Numerical Problems)

VII Answer any THREE of the following. Each question carries three marks. 3×3=9

41) Calculate the amount of KCl which must be added to 1 kg of water so that the freezing point is depressed by 2K. (k_f of water = 1.86 K kg mol^{-1}).

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42) The vapour pressure of water is 12.3 KPa at 300K. Calculate the vapour pressure of 1 molal solution containing a non-volatile solute dissolved in it.

43) The following data were obtained during the first order thermal decomposition,
$SO_2Cl_2(g) \rightarrow SO_2(g) + Cl_2(g)$, at a constant volume :

Experiment	Time (s)	Total pressure (atm)
1.	0	0.4
2.	100	0.7

Calculate the rate constant (k).

44) The ratio of rate constants of a reaction at 300K and 290K is 2. Calculate the energy of activation. Given ($R=8.314\ JK^{-1}mol^{-1}$)

45) How many electrons flow through a metallic wire if a current of 0.5A is passed for 2 hours. (Given $1F = 96500\ C\ mol^{-1}$).

46) Calculate the EMF of the following cell at 298K.

$$Mg_{(s)} \mid Mg^{2+}_{(0.1M)} \parallel Cu^{2+}_{(1\times10^{-3}M)} \mid Cu_{(s)}$$

Given $E^{\circ}_{Cu^{2+}|Cu} = +034V$ and $E^{\circ}_{Mg^{2+}|Mg} = -2.37V$

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Collection Of Question Papers For POCKET MARKS 70/70

Karnataka School Examination and Assessment Board
SECOND PUC PREPARATORY EXAMINATION - JANUARY 2025

Time: 3 Hours **CHEMISTRY (34)** **Max Marks: 70**

DISTRICT : SHIVAMOGGA

Instructions:

1. Question paper has FIVE parts. All parts are compulsory.
2. a. Part - A carries 20 marks. Each question carries 1 mark.
   b. Part - B carries 06 marks. Each question carries 2 marks.
   c. Part - C carries 15 marks. Each question carries 3 marks.
   d. Part - D carries 20 marks. Each question carries 5 marks.
   e. Part - E carries 09 marks. Each question carries 3 marks.
3. In Part - A questions, first attempted answer will be considered for awarding marks.
4. Write balanced chemical equation and draw neat labeled diagrams and graphs wherever necessary.
5. Direct answers to the numerical problems without detailed stepsand specific unit for final answer will not carry any marks.
6. Use log tables and simple calculator if necessary (use of scientific calculator is not allowed)

PART – A

I. Select the correct option from the given choices. **15x1=15**

1. In Kolbe's reaction, phenol is converted into
   a) salicylic acid b) salicylaldehyde
   c) benzoic acid d) benzaldehyde

2. The nitrogeneous heterocyclic base present only in DNA is
   a) uracil b) cytosine
   c) thymine d) guanine

3. Which of the following liquid-liquid solution shows negative deviation from Raoult's law?
   a) Benzene and Toluene b) Water and Ethanol
   c) Acetone and Chloroform d) Chlorobenzene and Bromobenzene

4. Among the following halogen containing compounds, which one will readily undergoes nucleophilic substitution reaction?
   a) $CH_2 - CH{=}CH_2$ (Cl) b) $CH_2 - Cl$ (benzene ring) c) $CH{=}CH_2$ (Cl) d) $CH_3 - CH_2 - Cl$

5. When initial concentratin of the reactant is doubled, then the half-life of a zero-order reaction
   a) is halved b) is doubled
   c) is tripled d) remains unchanged

6. Which of the following does not undergo Hell-Volhard-Zelinsky reaction?
   a) Ethanoic acid b) Propanoic acid
   c) 2-methyl propanoic acid d) 2, 2-dimethyl propanoic acid

7. Consider a blood cell placed in NaCl solution of concentration more than 0.9%(w/V). Which one of the following statements is true in this case?
   a) Osmosis takes place from cell to NaCl solution and the cell shrinks.
   b) Osmosis takes place from NaCl solution to cell and the cell swells.
   c) Osmosis takes place from cell to NaCl solution and the cell swells.
   d) Osmosis takes place from NaCl solution to cell and the cell shrinks.

8. In neutral or faintly alkaline medium, $KMnO_4$ oxidises iodide ions into iodate. The change in oxidation state of manganese in this reaction is from
   a) +7 to +2 b) +7 to +4
   c) +6 to +4 d) +7 to +6

9. Chloroform is stored completely filled in a closed dark coloured bottle. This is to
   a) prevent the oxidation of chloroform by air in the presence of sunlight.
   b) prevent the evaporation of chloroform.
   c) prevent the reaction of chloroform with nitrogen of the air.
   d) prevent the reaction of chloroform with CO_2 to form extremely poisonous gas carbonyl chloride.

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10. The sum of coordination number and oxidation number of the metal M in the complex $[M(en)_2(C_2O_4)]Cl$ is
a) 6 b) 7 c) 8 d) 9

11. If the E^0_{Cell} for a given reaction has negative value, then which of the following is the correct relationship for the value of ΔG^0 and K_{eq}?
a) $\Delta G^0 > 0$ and $K_{eq} > 1$
b) $\Delta G^0 < 0$ and $K_{eq} < 1$
c) $\Delta G^0 > 0$ and $K_{eq} < 1$
d) $\Delta G^0 < 0$ and $K_{eq} > 1$

12. Match the following:

List - I	List –II
A) Sulphur containing amino acid	(i) Proline
B) Aromatic amino acid	(ii) Phenylalanine
C) Heterocyclic amino acid	(iii) Aspartic acid
D) Aromatic acid	(iv) Cysteine
	(v) Lysine

a) A – (iii), B – (i), C – (ii), D – (v)
b) A – (i), B – (iii), C – (ii), D – (v)
c) A – (ii), B – (iii), C – (i), D – (v)
d) A – (iv), B – (iii), C – (i), D – (ii)

13. p-hydroxy azobenzene is prepared from benzene diazonium chloride and phenol in
a) acidic medium
b) basic medium
c) neutral medium
d) both acidic and basic medium

14. Given below are two statements.
Statement I : The acidic strength of monosubstituted methyl phenol is lower than phenol because of electron releasing methyl group.
Statement II : o-cresol, m-cresol and p-cresol will have same acidic strength as they have one methyl group attached to the benzene group.
In the light of the above two statements, choose the options given below.
a) Statement-I is incorrect but statement –II is correct.
b) Both Statement-I and statement –II are correct.
c) Both Statement-I and statement –II are incorrect.
d) Statement-I is correct but statement –II is incorrect.

15. Cobalt(III)chloride forms several octahedral complexes with ammonia. Which of the following will not give test for chloride ion with silver nitrate solution?
a) $CoCl_3.4NH_3$
b) $CoCl_3.5NH_3$
c) $CoCl_3.6NH_3$
d) $CoCl_3.3NH_3$

II. Fill in the blanks by choosing the appropriate word from those given in the brackets (chromium, aldehydic, increases, denatured alcohol, nitrobenzene, decreases) 5x1= 5

16. The transition metal having highest melting point in 3d- series of d-Block is .....
17. When benzene diazonium fluoroborate is heated with $NaNO_2$, then the compound obtained is .....
18. The commercial alcohol which is obtained by mixing small amount of methanol, copper sulphate and pyridine is called as .....
19. If the dissolution of a solid solute in the given solvent is exothermic, then the solubility of the solute ..... with increase in temperature.
20. Gatterman-Koch reaction of aromatic compounds introduces .....group in the aromatic ring.

PART – B

III. Answer any THREE of the following. Each question carries 2 Marks. **3x2=6**

21. Explain Finkelstein's reaction with an example.
22. Give one example each for
    a) Water soluble vitamin
    b) Water insoluble vitamin
23. What is a pseudo-first order recation? Give an example.
24. How does phenol reacts with bromine water? Give equation for the reaction.
25. Give any two differences between Lanthanoids and Actinoids.

PART-C

IV. Answer any THREE of the following. Each question carries 3 Marks. **3x3=9**

26. (a) Give one reason each for the following: **2**
    (i) Transition metals have good catalytic property.
    (ii) The spin only magnetic moment of Zn^{2+} ion is zero.
    (b) What are interstitial compounds? **1**
27. On the basis of Valence bond theory, explain hybridisation, geometry and magnetic property of $[Ni(CN)_4]^{2-}$ ion. (Atomic number of Ni = 28). **3**
28. Explain the preparation of potassium permanganate from MnO_2 ore. **3**
29. (a) Draw the structure of cis-isomer and trans-isomer of $[Pt(en)_2Cl_2]^{2+}$ complex ion. **2**
    (b) With the help of crystal field theory, find the number of unpaired electrons in octahedral complex of Fe^{3+}(Atomic No. of Fe = 26) in the presence of weak field ligand. **1**
30. (a) What is a ambidentate ligand? Name the chelating ligand that is used in the estimation of hardness of water. **2**
    (b) Write the IUPAC name of the complex $[Co(NH_3)_5(ONO)]Cl_2$. **1**

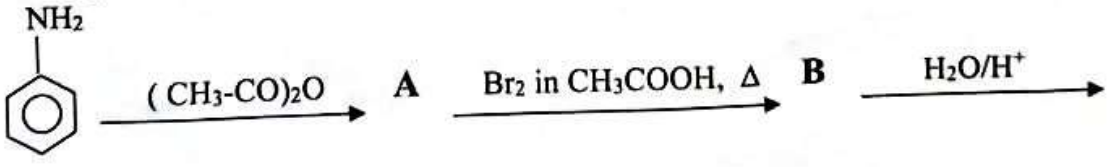
V. Answer any TWO of the following. Each question carries 3 Marks. **2x3=6**

31. (a) State Faraday's first law of electrolysis. For the electrode reaction, $Al^{3+} + 3e^- \longrightarrow Al$ how many coloumbs of charges are required to obtain one mole aluminium? **2**
    (b) Write the mathematical expression for limiting molar conductivity of $MgCl_2$. **1**
32. (a) How solubility of a gas in liquid varies with a) Pressure b) Temperature? **2**
    (b) Give one example for maximum boiling azeotrope. **1**
33. (a) Draw a neat labelled diagram of Hydrogen-Oxygen fuel cell. **2**
    (b) Write the half-cell reaction of standard hydrogen electrode when it acts as anode. **1**
34. Derive the integrated rate equation for first-order reaction. **3**

PART-D

VI. Answer any FOUR of the following. Each question carries 5 Marks. **4x5=20**

35. (a) Identify the major organic product **A** , **B** and **C** in the following reaction sequence: **3**



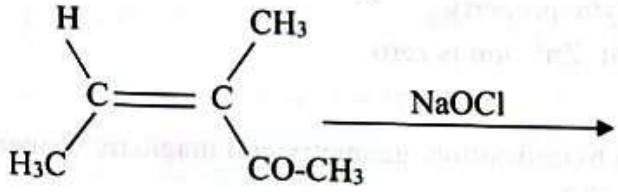
(b) Explain carbyl amine reaction with an example. 2

36. (a) With an example explain the preparation of Ketones by using 4
(i) Aromatic hydrocarons
(ii) Nitriles
(b) Between methanal and ethanal, which would undergo Cannizzaro's reaction? 1

37. (a) Write the Haworth structure of Maltose. 2
(b) What is a peptide bond? How many peptide bonds are presenr in tripeptide? 2
(c) Name the enzyme that catalyses the hydrolysis of maltose into glucose. 1

38. (a) Explain the mechanism of alkali hydrolysis of 2-bromo-2-methyl propane to form 2-methyl propan-2-ol. 3
(b) Why aryl halides are less reactive towards nucleophilic substitution reaction? 2

39. (a) How do you convert 4
(i) propanal into propane ?
(ii) methyl magnesium chloride into etanoic acid?
(b) Complete the following reaction: 1



PART-E

VII. Answer any THREE of the following . Each question carries 3 Marks. 3x3=9

40. At 330K, a solution of liquid A and liquid B is found to obey Raoult's law. If the vapour pressure of pure A liquid and pure B liquid are respectively 194 mm Hg and 70 mm Hg, calculate the vapour pressure of the solution containing 5 mole of liquid A and 3 mole of liquid B.

41. The boiling point of a solution containing 37g of of a non-volatile solute in 500g of water is 373.42K. If the boiling point of water is 373 K, find the molar mass of the solute.
(K_b for Water = 0.512 K kg mol^{-1})

42. The standard cell potential of the following cell at 298 K is 2.71V:
$Mg/Mg^{2+}(0.1M) // Cu^{2+}(0.01M)/Cu$
Write the overall cell reaction and calculate the emf of the cell.

43. The conductivityof 0.0024 M solution of acetic acid at 298K is 7.896×10^{-5} S cm^{-1}. If the limiting molar conductivity of acetic acid is 396.5 S cm^2 mol^{-1}, calculate the molar conductivity and degree of dissociation (α) of acetic acid.

44. For the reaction, aA + bB $\longrightarrow$ Products the order of reaction with respect to reactant A is one and order of reaction with respect to reactant B is two.
(i) Write the expression for rate law of the reaction.
(ii) What is the increase in rate of reaction if both [A] and [B] are increased by three times.
(iii) Write the unit of rate constant of the reaction.

45. The specific reaction rate of a reaction increased by three times when temperature of the reaction was changed from 293 K to 313 K. Calculate energy of activation of the reaction.
(R = 8.314 J K^{-1} mol^{-1})

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Collection Of Question Papers For POCKET MARKS 70/70

TUMAKURU DISTRICT P.U. COLLEGES PRINCIPALS' ASSOCIATION (R.)

SECOND PUC PREPARATORY EXAMINATION JANUARY -2025

Time: 3-00 hours | No.of pages: 04

CHEMISTRY (34)

Max Marks : 70 | Total No.of Ques: 46

DISTRICT : TUMAKURU

Instructions: 1] Question paper has five parts, A, B, C, D & E.
2] Part-A carries 20 marks. Each question carries 1 mark.
Part-B carries 6 marks. Each question carries 2 marks .
Part-C carries 15 marks. Each question carries 3 marks .
Part-D carries 20 marks. Each question carries 5 marks .
Part-E carries 9 marks. Each question carries 3 marks. All the parts are compulsory.
3] Write balanced chemical equations and draw neat labelled diagrams wherever necessary.
4] Direct answer to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.
5] For Part-A questions ,only the first written answer will be considered for awarding marks.
6] Use log tables and the simple calculators if necessary. (Use of scientific calculator is not allowed

PART-A

I Select the correct option among the four given options for ALL the following questions. **15x1=15**

1) Under the influence of a catalyst, what happens to the activation energy of a reaction?

a] Activation energy increases expoenetially b] Activation energy lowered
c] Activation energy remains the same d] Activation energy increases two fold

2) The concentration term depends on temperature is__

a] PPm b] Mole fraction c] Molality d] Molarity

3) An electrochemical cell can behave like an electrolytic cell when ___

a] $E_{cell}=0$ b] $E_{cell} > E_{Ext}$ c] $E_{Ext} > E_{cell}$ d] $E_{cell}=E_{Ext}$

4) Van't Hoff's factors of aqueous solution of x, y, z are 1.0, 0.8 and 2.5. Hence their (assume equal concentration in all these cases)

a] Boiling point $x < y < z$ b] Freezing point $z < x < y$
c] Osmotic pressure $x = y = z$ d] Vapour pressure $y < x < z$

5) Electronic configuration of a transition element 'X' in +3 oxidation state is $_{18}$ [Ar] $3d^5$ what is its atomic number_____

a]25 b] 26 c] 27 d] 24

6) Which of the following is Homoleptic complex____

a] $[Cr (H_2O)_4Cl_2]^+$ b] $Pt (NH_3)_2Cl]$

c]$[Co(NH_3)_6]^{3+}$ d] $[Co(NH_3)_5 NO_2]Cl_2$

7) The complex $Pt (OH)_2(NH_3)_4SO_4$ is treated with $BaCl_2$ solution one mole of $BaSO_4$ is formed. The primary and Secondary valency of Pt in this complex is ___

a] 2 and 6 b] 6 and 1 c] 3 and 6 d] 4 and 6

P.T.O.

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8) Ethylidene chloride is a/ an _____
a] vic-dihalide b] gem-dihalide c] Allylic halide d] Vinylic halid

9) Choose the compound which is more acidic than phenol___
a] O-nitrophenol b] ethanol
c] O-methyl phenol d] O - methyoxy phenol

10) Which one of the following on oxidation gives ketone___
a] Primary alcohol b] Secondary alcohol c] Tertiary alcohol d] All these

11) The reagent which does not react with both acetone and benzaldehyde?
a] Sodium hydrogen sulphite b] Phenyl hydrazine
c] Fehling's solution d] Grignard reagent

12) Which of the following is the strongest acid _____
a] CH_3COOH b]$BrCH_2COOH$ c] $ClCH_2COOH$ d] ICH_2COOH

13) Which of the following is a tertiary amine?
a] 1-methyl cyclohexyl amine b] Triethyl amine
c] tertiary butyl amine d] N-methyl ethanamine

14) During diazotization the nitrous acid is produced in the reaction mixture by the reaction of ___
a] $NaNO_2$ and HCl b] $NaNO_3$ and HCl
c] $NaNO_2$ and HNO_3 d] $NaNO_3$ and HNO_2

15) The bases that are common in both DNA and RNA are _____
a] adenine, guanine, cytosine b] Adenine, guanine, Thymine
c] Adenine, Uracil, Cytocine d] Guanine, Uracil, Thymine

II Fill in the blanks by choosing appropriate word from those given in the bracket: **5x1=5**

[Primary valency, Glueagon, Tollen's reagent order, Molecularity, SN^2]

16) The number of moles of reactants taking part in a single step of a reaction is _____
17) According to Werner's theory the charge on the central metal ion is _____
18) _____ Mechanism of alkyl halide involves complete invertion of configuration.
19) Ammonical silver nitrate solution is known as _____
20) _____ is the hormone that increases the glucose level in blood.

PART-B

III Answer any THREE of the following questions , each carries 2 marks. 3x2=6

21) What is reverse osmosis? Mention any one of its use.
22) Explain the synergic effect in the formation of metal carbonyl.

Cont..

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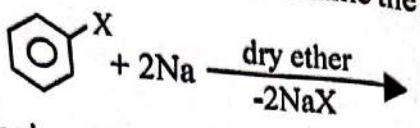
23) Complete the following equation and name the reaction



24) How does ethanoic acid reacts with methanol in the presence of conc. H_2SO_4. Write the equation and name the reaction.

25) Write the Howorth structure of Lactose.

PART-C

IV Answer any THREE of the following questions , each carries 3 marks. 3x3=9

26) a] Give two reasons for transition metals show catalytic property.
b] Write the formula to calculate spin only magnetic moment. (2+1)

27) a]Give reason actinoids shows variable oxidation states.
b] What is the main cause for Lanthanoid contraction . (2+1)

28) For the manufacture of $K_2Cr_2O_7$ from chromite ore write the balanced chemical equations.

29) Using V.B.T. account for the geometry hybridisation and magnetic property of $[CoF_6]^{3-}$ (z=27)

30) What is Ionisation isomerism? Write the linkage isomer for $[Co(NH_3)_5NO_2]Cl_2$ and write its IUPAC name.

V Answer any TWO of the following questions , each carries 3 marks. 2x3=6

31) a]What type of deviation from Raoult's law is observed when equal volume of ethanol and acetone are mixed together? Mention the reason for it.
b] State Henry's law. (2+1)

32) Write the neat labelled diagram of Daniel cell. Write its symbolic representation and over all cell reaction.

33) a]Write the equation of anodic and cathodic reactions occur during rusting of Iron.
b] What are fuel cells? (2+1)

34) Derive integrated rate constant (K) expression for a first order reaction in gaseous phase (system).

PART-D

VI Answer any FOUR of the following questions , each carries 5 marks. 4x5=20

35) a] Explain the mechanism of acid catalysed hydration of alkenes to alcohols? Write the equations.
b] How do you prepare phenol from cumene write the equation . (3+2)

36) a] Write the steps involved in the mechanism of hydrolysis of tertiary butyl bromide to tertiary butyl alcohol.
b] Explain Zaitsev rule with example.
c] Write the general formula of Grignard reagent. (2+2+1)

P.T.O.

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37) a] Write the names of the following reactions.

i) $2CH_3\text{-}CHO \xrightarrow[ii)\ Heat]{i)di\ /\ NaOH} CH_3\text{-}CH{=}CH\text{-}CHO$

ii) $CH_3\text{-}\overset{O}{\overset{\|}{C}}\text{-}CH_3 \xrightarrow{Zn\text{-}Hg\ /\ conc.HCl} CH_3\text{-}CH_2\text{-}CH_3 + H_2O$

b] Explain Wolf-Kishner reduction with an example.

c] Name the product formed when an aldehyde reacts with hydroxyl amine.(2+2+1)

38) a] Write the chemical equation for the reaction convertion of

i) Benzoic acid to m-nitro benzoic acid ii) Acetic acid to Acetamide

iii) Toluene to benzoic acid

b] How are carboxylic acids are prepared from Grignard reagent? Write equation.(3+2)

39) a] What is Hinsberg's reagent? How do you distinguish 1^0, 2^0 and 3^0 amines using this reagent?

b] Write the chemical equation for benzene diazonium chloride reacts with phenol in basic medium? Mention the colour of the product. (3+2)

40) a] What are essential amino acids? Write the zwitter ionic structure of Glycine.

b] Name the product obtained when glucose reacts with i) HI ii) Br_2 / H_2O

c] Name a vitamin that is stored in liver and adipose tissues. (2+2+1)

PART-E

VII Answer any THREE of the following questions , each carries 3 marks. 3x3=9

41) 100g of liquid A (molar mass $140gmol^{-1}$) was dissolved in 1000g of liquid B (molar mass $180gmol^{-1}$). The vapour pressure of liquid solution was found to be 500 torr. Calculate the vapour pressure of liquid A. If the vapour pressure of the solution is 475 torr.

42) On dissolving 2.34g of non-electrolyte solute in 40g of benzene, the boiling point of solution was higher than benzene by 0.81K. Calculate the molar mass of solute. [Given K_b for benzene is 2.53K $Kgmol^{-1}$ and molar mass of benzene is 78 $gmol^{-1}$]

43) Calculate the emf of the cell in which the following reactions taking place.

$$Ni_{(s)} + 2Ag^{+}_{(aq)\ (0.002M)} \rightleftharpoons Ni^{2+}_{(aq)\ (0.160M)} + 2Ag_{(s)} \qquad (Given\ E^0cell = 1.05V)$$

44) How long has a current of 3 ampere to be passed through a solution of silvernitrate to coat a metal surface with 0.42 g of Ag (Atomic mass of Ag = 108)

45) A first order reaction requires 20 minutes for 50% completion.
Calculate [a] rate constant and [b] using rate constant calculate the time required for 90% completion of the reaction.

46) The rate of a particular reaction doubles when temperature changes from 27^0C to 37^0C. (Given R= $8.314JK^{-1}mol^{-1}$)

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Collection Of Question Papers For POCKET MARKS 70/70

II P.U.C PREPARATORY EXAMINATION JANUARY - 2025

Subject: Chemistry **Duration: 180 Min**

Date: 18.01.2025 **Maximum Marks: 70**

Instructions

DISTRICT : UDUPI

Question paper has FIVE parts. All parts are compulsory.

Part-A carries 20 marks. Each question carries 1 mark.

Part-B carries 06 marks. Each question carries 2 marks.

Part-C carries 15 marks. Each question carries 3 marks.

Part-D carries 20marks. Each question carries 5 marks.

Part-E carries 09 marks. Each question carries 3 marks.

PART-A

I. Select the correct option from the given choices. **15 ×1 = 15**

1. When a solute is present in trace quantities, the convenient concentration term that can be used is
   a) molarity b) molality c) ppm d) mole fraction.
2. If 50% of a reaction is complete in 100 seconds and 75 % of it is complete in 200 seconds, the order of the reaction is
   a) 1 b) 2 c) 0 d) none.
3. Which of the following transition metal ion is has highest magnetic moment?
   a) Fe^{2+} b) Cr^{2+} c) Mn^{2+} d) Co^{2+}
4. The complex $PtCl_2 4NH_3 Br_2$ is treated with excess of $AgNO_3$ solution, two moles of AgBr is precipitated. The primary and secondary valence of Pt in the complex is
   a) 6 and 1 b) 6 and 2 c) 4 and 6 d) 3 and 6
5. **Statement I:** Grignard's reagents are prepared by the action of Mg on organic halides in dry ether.
   Statement II: The above reaction can be carried out in water as solvent.
   Identify the correct statement
   a) Both statement I and II are correct
   b) Both statement I and II are incorrect
   c) Statement I is correct and statement II is incorrect.
   d) Statement I is incorrect and statement II is correct.
6. The quantity of electricity needed to discharge 20 g of Ca from molten $CaCl_2$
   a) 2F b) 1F c) 3F d) 0.5F
7. A steroid harmone among the following is
   a) insulin b) epinephrine c) thyroxine c) estrogen
8. Ethylamine when treated with nitrous acid gives
   a) ethyl alcohol b) methyl alcohol c) ethyl nitrate d) ethane
9. The chemical name of phosgene is
   a) chromyl chloride b) triphenylphosphine
   c) phosphorusoxychloride d) carbonyl chloride.
10. Which one is the most acidic compound
    a) phenol b) p-nitro phenol c)2,4,6-trinitro phenol d) p-methylphenol

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11. To differentiate between pentan-2-one and pentan-3-one a test is carried out. Which of the following is the correct answer?
    a) pentan-2-one will give silver mirror test b) pentan-2-one will give iodoform test
    c) pentan-3-one will give iodoform test d) none of these.
12. Which of the following solutions has the lowest boiling point?
    a) 1m NaCl b) 1m $MgCl_2$ c) 1m $AlCl_3$ d) 1m $C_6H_{12}O_6$
13. The IUPAC name of $[Pt(NH_3)_2Cl(NO_2)]$ is
    a) Platinum diaminechloronitrite b) chloronitrito-N-ammineplatinum(II)
    c) diamminechloridonitrito-N-platinum(II) d) diamminechloronitrito-N-platinate(II)
14. The carbonyl compound that gives a secondary alcohol when treated with Grignard's reagent followed by hydrolysis is
    a) HCHO b) CH_3CHO c) CH_3COCH_3 d) $CH_3CO\ CH_2CH_3$
15. Which of the following diseases is not correctly matched with the vitamins mentioned with it
    a) Vitamin B_2 - Cracking of lips
    b) Vitamin C – Bone deformaties
    c) Vitamin D - Osteomalacia
    d) Vitamin A – Night blindness

II. Fill in the blanks by choosing the appropriate word from those given in the brackets: (aldehydes, less, p-aminoazobenzene, increases, greater, acid anhydride) **5×1= 05**

16. The melting point of interstitial compound is _____ than the pure metal.
17. Benzenediazonium chloride reacts with aniline to give_____.
18. A tertiary alcohol is _____acidic than a secondary alcohol.
19. When a non-volatile solute is added to the pure solvent, the boiling point of solvent_____
20. Carboxylic acids form ____when heated with P_2O_5

PART -B

III. Answer ANY THREE of the following. Each question carries two marks. **3 × 2 = 06**

21. Explain Finkelstein's reaction with an example.
22. Write the reactions to show that glucose contains a) a straight chain of six carbon atoms b) an aldehyde group.
23. What is a pseudo first order reaction? How a higher order reaction can be converted to first order?
24. Explain a method to convert ethanol to ethene with equation.
25. The first I.E of Cr is lower and the 2nd I.E of zinc is higher than expected. Give reasons.

PART-C

IV. Answer ANY THREE of the following. Each question carries three marks. **3 × 3 = 09**

26. What is lanthanoid contraction? Write any two consequences.
27. a) Draw the optical isomers of $[CoCl_2(en)_2]^+$
    b) Which isomer of the above ion cannot show optical isomerism?
28. Write the equations for the preparation of potassium dichromate from the chromite ore.
29. a) On the basis of Crystal field theory write the electronic configuration of d^4 in octahedral complex when i) $\Delta_0 > P$ ii) $\Delta_0 < P$
    b) Write the structure of $Co_2(CO)_8$

30. Explain why $[Co(NH_3)_6]^{3+}$ is an inner orbital complex and $[CoF_6]^{3-}$ is an outer orbital complex.

V. Answer ANY TWO of the following. Each question carries three marks. **2 × 3 = 06**

31. Write the reactions occurring at the two electrodes in H_2-O_2 fuel cell. Name the catalyst used to increase the rate of electrode reactions.
32. Derive integrated rate equation for the rate constant of first order reaction.
33. a) Plot a graph showing the variation of the molar conductivity v/s c ½ for a strong and a weak electrolyte in solution.
    b) State the law which enables to find the limiting molar conductivity of weak electrolytes.
34. a) Write a diagram(graph) showing the depression of the freezing point of a solvent in solution.
    b) What should be the concentration of sodium chloride solution so that it's osmotic pressure will be equal to that of the fluid inside blood cell?

PART-D

VI. Answer ANY FOUR of the following. Each question carries five marks. **4 × 5 = 20**

35. a) How do you distinguish between primary, secondary and tertiary amines by using Hinsberg's reagent with chemical equations involved?
    b) Write equations for the following conversions
    i)Acetamide to methanamine ii) Aniline to phenyl isocyanide (3+2)
36. a) Write three differences between SN_1 and SN_2 reaction mechanisms.
    b) How do you convert 1-chlorobutane to n-octane? Write the name of the reaction. (3+2)
37. a) Write the Haworth structure of maltose. Is maltose a reducing sugar?
    b) Which structure of proteins gives i) sequence of amino acids
    ii) two major molecular shapes?
    c) Name the type of bonding that holds together the nitrogenous bases in DNA. (2+2+1)
38. a) An aromatic hydrocarbon 'A' having molecular formula C_9H_{12} is oxidised in the presence of air to give a compound 'B'. The compound 'B' is treated with dilute acid to give two organic compounds 'C' and' D'. The compound C forms a white precipitate 'E' with bromine water. Write the three chemical reactions carried out in the above conversions.
    b) Complete the following equations (3+2)
    i) $(CH_3)_3COCH_3 + HI \rightarrow$
    ii) $C_6H_5OCH_3 + 2Br_2 \rightarrow$
39. a) Write equations for the following conversions and name the reactions.
    i) benzoyl chloride into benzaldehyde,
    ii) propanone to propane.
    b) Name the reagent used to convert a carboxylic acid into a hydrocarbon. (4+1)
40. a) Write the IUPAC names of the main products formed in the following reactions.
    i) $2\ CH_3CHO \xrightarrow[ii)\ \Delta]{i)\ dil\ NaOH}$
    ii) $CH_3CONH_2 \xrightarrow[\Delta]{H_3O^+}$
    iii) $CH_3COOH + C_2H_5OH \xrightarrow{Conc.H_2SO_4}$
    b) What is the main difference in the nature of the products formed when an aldehyde and a ketone are oxidised? (3+2)

PART–E
(NUMERICAL PROBLEMS)

VII. Answer ANY THREE of the following. Each question carries three marks. $3 \times 3 = 09$

41. The first order rate constant for the decomposition of ethyl iodide according to the equation $C_2H_5I \longrightarrow C_2H_4 + HI$ at 600K is $1.60 \times 10^{-5}\ s^{-1}$. It's energy of activation is 209 kJ/mol. Calculate the rate constant of the reaction at 700 K.
42. The vapour pressure of dichloromethane (molar mass 119.5 g/mol) and chloroform (molar mass 85 g/mol) at 298K are 200 and 415 mm of Hg respectively. Calculate the vapour pressure of the solution prepared by mixing 25.5 g 0f dichloromethane and 40 g of chloroform at 298K.
43. The electrical resistance of a column of 0.05 $molL^{-1}$ NaOH solution of diameter 1 cm and length 50 cm is 5.55×10^3 ohm. Calculate it's resistivity, conductivity and molar conductivity.
44. 450 cm^3 of an aqueous solution of a protein contains 1.0 g of the protein. The osmotic pressure of such a solution is found to be 3.1×10^{-4} bar at 310 K. Calculate the molar mass of the protein. (R=0.083Lbar/mol/K)
45. If a current of 0.5 ampere flows through a metallic wire for 2 hours, calculate the number of electrons that would flow through the wire.
46. The half-life for radioactive decay of C^{14} is 5730 years. An archaeological artefact containing wood had only 80% of the C^{14} found in a living tree. Estimate the age of the sample.

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Collection Of Question Papers For POCKET MARKS 70/70

UKDPUCPA

II PUC PREPARATORY EXAMINATION - 2025

CHEMISTRY (34)

Time 3-00 Hours | Max Marks 70

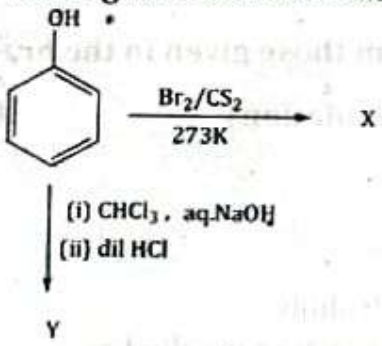
Instructions: The question paper has five parts. All the four parts are compulsory.
PART-A carries 20 marks; Each question carries one mark.
PART-B carries 6 marks. Each question carries two marks.
PART-C carries 15marks. Each question carries three marks.
PART-D carries 20 marks. Each question carries five marks.
PART-E carries 9 marks. Each question carries three marks.
Write balanced chemical equations and draw diagrams wherever necessary.

DISTRICT : UTTARA KANNADA

PART-A

I. Select the correct option from the given choices 1 X 15 = 15

1. Which of the following ligands can exhibit Linkage isomerism
   a) NH_3 b) NO_2^- c) Br^- d) H_2O
2. The order of reaction in which unit of rate of reaction and rate constant are same
   a) 0 b) 1 c) 1/2 d) 2
3. In the given reaction X and Y are



   a) bromobenzene and acetophenone b) o- and p- bromophenol and salicylaldehyde
   c) p-bromophenol and salicylic acid d) o-bromophenol and benzoic acid
4. Role of Alcoholic KOH in β-elimination reaction is to bring about
   a) Dehalogenation b) Dehydrogenation
   c) Dehydration d) Dehydrohalogenation
5. Solubility of gas in liquid
   a) Increase with increase in temperature b) Decrease with increase in temperature
   c) Unaffected on changing the temperature d) Decrease with increase in pressure
6. Which of the following product is formed when carbonyl compound is treated with hydroxylamine
   a) Imine b) Schiff's base
   c) Oxime d) Hydrazone
7. Deficiency of which vitamin causes Pernicious anaemia
   a) B_1 b) B_2 c) B_{12} d) B_6
8. Which of the following observation is shown by 2-methylpropan-2-ol with Luca's reagent?
   a) Turbidity will be observed after five minutes
   b) No turbidity will be observed at room temperature
   c) Turbidity will be observed immediately
   d) None of this

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9. The E^0 of Fe^{2+}/Fe, Zn^{2+}/Zn and Sn^{2+}/Sn are -0.44 V, -0.76 V, -0.14 V respectively. Which metal/s is/are act as sacrificial electrode to protect iron from rusting.
   a) Both Zn and Sn b) Zn only
   c) Sn only d) Neither Zn or Sn
10. A reaction is of first order in reactant A and of second order in reactant B. When the concentration of A as well as B is doubled, the rate of reaction will ...
   a) Increases by 4 times b) Increases by 2 times
   c) Increases by 8 times d) Increases by 6 times
11. The hybridised state of carbon in carbonyl group is
   a) Sp^3 b) Sp^2 c) Sp d) dSp^2
12. The oxidation of trichloromethane results in the formation of poisonous gas called
   a) Carbon monoxide b) Carbonyl chloride
   c) Hydrogen sulphide d) Phosphine
13. Heinsberg's reagent is
   a) Benzene sulphuryl chloride b) Chlorobenzene
   c) Benzene sulphonyl chloride d) Benzene carbonyl chloride
14. The geometry of the complex $Fe(CO)_5$
   a) Octahedral b) Tetrahedral
   c) Triagonal bipyramidal d) Square bipyramid
15. Which of the following metal ion is colourless.
   a) V^{2+} b) Cr^{3+} c) Zn^{2+} d) Ti^{3+}

II. Fill in the blanks by choosing the appropriate word from those given in the brackets:

(Reduction, Molecularity, Iron, Starch, Glycogen, Oxidation) **1X 5= 5**

16. Storage polysaccharide in plant cell.....
17. Haemoglobin is the coordination compound of.....
18. Arylamines gets coloured on storage due to.....
19. Aldehydes and ketones on..... to give corresponding alcohols.
20. The number of molecules taking part in the elementary reaction is called as.....

PART-B

III. Answer any three of the following. Each questions carries two marks: **3 X 2= 6**

21. Define: a) Molarity b) Isotonic solutions
22. Explain the preparation of phenol from cumene.
23. What is crystal field splitting. If $\Delta_0 < P$, on the basis of crystal field theory, write the electronic configuration of d^4 ion, in an octahedral complex.
24. How aryl halides are converted in to diphenyl. Write the reaction
25. What is denaturation of protein? Which structure of protein remains intact during denaturation of protein.

PART-C

IV. Answer any three of the following. Each questions carries three marks: **3 X 3= 9**

26. Write the balanced chemical equation for the preparation of potassium dichromate from chromite ore.
27. a) What is Lanthanoid contraction? Mention one consequence of it.
   b) What are interstitial compounds? **(2+1)**

28. a) Study of Actinoids elements is more difficult: Give two reasons.
    b) Name the element of first transition series (3d series) which shows highest oxidation state in its compound. **(2+1)**

29. Based on VBT, explain the geometry, hybridisation and magnetic property of $[Ni(CN)_4]^{2-}$ ion (Atomic number of Ni is 28)

30. Draw the structures of optical isomers of $[Pt\ Cl_2(en)_2]^{2+}$
    What is the coordination number of Platinum in this complex?

V. Answer any two of the following. Each questions carries three marks: **2 X 3= 6**

31. Write any three differences between ideal and non-ideal solutions.
32. State Faraday's first law of electrolysis. Mention any two factors which determine the product of electrolysis.
33. Draw the neat labelled diagram of H_2-0_2 fuel cell. Write the reaction which takes place at cathode and anode in H_2-0_2 fuel cell.
34. Derive an integrated rate equation for rate constant of zero order reaction.

PART-D

VI. Answer any four of the following. Each questions carries five marks: **4 X 5= 20**

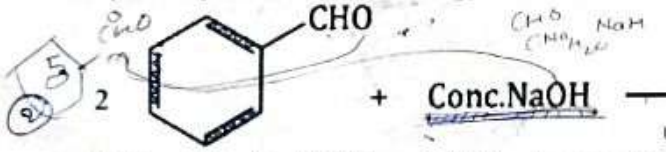
35. a) Write the equation for the steps in the mechanism of acid catalysed dehydration of ethanol to ethene.
    b) Identify X and Y

$$H\text{-}CHO \xrightarrow[2.\ H_20]{1.\ RMgX,\ Ether} X \xrightarrow[573\ K]{Cu} Y$$

(3+2)

36. a) Write the mechanism involved in the conversion of tert-butyl bromide to tert-butyl alcohol. Mention the order.
    b) Define: i) Enantiomers ii) Chiral carbon **(3+2)**

37. a) Complete the following reaction and name the reaction.



    b) Explain Hell-Volhard-Zelinsky reaction with general equation. **(3+2)**

38. a) Write the Haworth structure of Maltose.
    b) Name the Amino acid which is optically inactive. Write its Zwitter ion form.
    c) Name the base present in RNA but not in DNA. **(2+2+1)**

39. a) Write the reaction involved in the Gabriel phthalimide synthesis for the preparation of primary amine.
    b) i) Give the IUPAC name of trimethylamine.
    ii) Arrange the following amines in the order of their increasing basic strength in aqueous solution: $(CH_3)_3N$, CH_3NH_2, $(CH_3)_2NH$. **(3+2)**

40. a) Between formic acid and acetic acid, which is weaker acid and why?
    b) How does benzoyl chloride converted in to benzaldehyde? Name the reaction. **(2+3)**

PART-E

VII. Answer any three of the following. Each questions carries three marks: 3 X 3= 9

41. 31 g of an unknown molecular compound is dissolved in 500 g of water. The resulting solution freezes at 271.14 K. Calculate the molar mass of compound.
[Given K_f for water = 1.86 KKgmol^{-1} T_f^o of water = 273K]

42. Heptane and octane form an ideal solution. At 373 K, the vapour pressure of the two liquid components are 105.2 kPa and 46.8 Kpa respectively. Calculate the vapour pressure of a solution containing 26 g of heptane and 35 g of octane
[Molar mass of heptane = 100 g/mol: Molar mass of octane = 114 g/mol:

43. 0.001028 M acetic acid solution has conductivity of 4.95 X 10^{-5} Scm^{-1}.
$\lambda^o m$ = 390.5 Scm^{2}mol^{-1}. Calculate the degree of dissociation of acetic acid.

44. Calculate the emf of the cell in which the following reaction takes place:
$Ni_{(s)} + 2Ag^+ (0.002\ M) \rightarrow Ni^{2+} (0.160\ M) + 2Ag_{(s)}$
Given that $E^o_{(cell)}$ = 1.05 V

45. The rate constant of chemical reaction doubles for an increase of 10 Kelvin temperature from 298 Kelvin. Calculate the activation energy of reaction (R = 8.314 J/mol/K)

46. A first order reaction is 80% complete in 90 minutes. Calculate the rate constant of the reaction.

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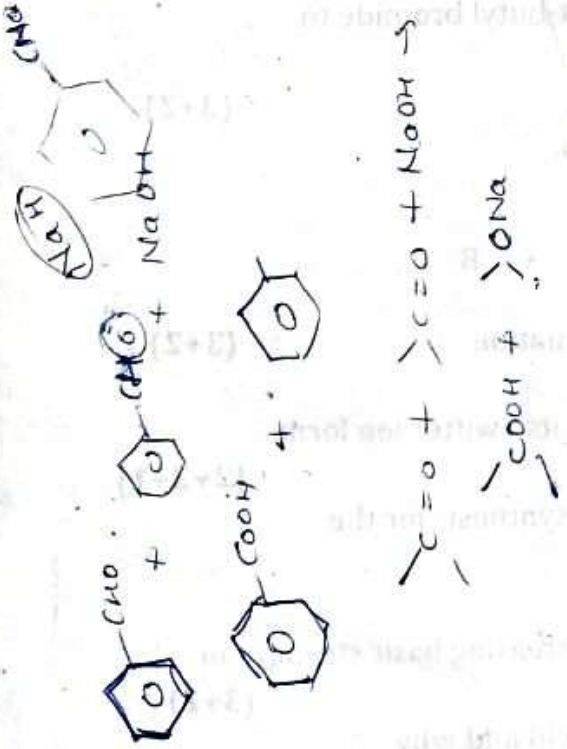

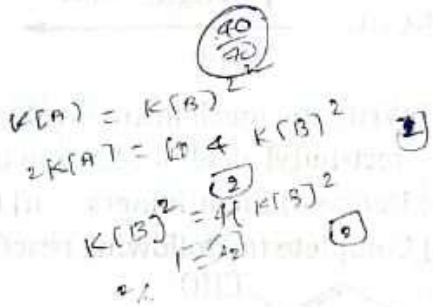

Collection Of Question Papers For POCKET MARKS 70/70

GOVERNMENT OF KARNATAKA Register Number : ☐☐☐☐☐☐

DEPUTY DIRECTOR, DEPT. OF SCHOOL EDUCATION (PRE-UNIVERSITY)

PUC-II YEAR PREPARATORY EXAMINATION-2025

Time : 3 Hours SUBJECT : **CHEMISTRY (34)** MARKS : 70

Instructions : 1) The question paper has five parts. A, B, C, D & E. All parts are compulsory.

2) a) PART-A Carries 20 marks, Each question carries 1 mark. b) PART-B Carries 06 marks, Each question carries 2 marks, c) PART-C Carries 15 marks, Each question carries 3 marks, d) PART-D Carries 20 marks, Each question carries 5 marks. e) PART-E carries 9 marks. Each question carries 3 marks.

3) In Part A questions, first attempted answers will be considered for awarding marks.

4) Write balanced chemical equations and draw neat labelled diagrams and graphs wherever required.

5) Direct answers to numerical problems without detailed steps and specific unit for final answer will not carry any marks.

6) Use log tables and the simple calculators if necessary. (Use of scientific calculator is not allowed)

PART - A

DISTRICT : VIJAYAPURA

I. Select the correct option from the given choices : **15X1=15**

1) In a solution containing non-volatile solute, the mole fraction of Solvent is 0.9. The relative lowering of vapour pressure is
   a) 1 b) 0.1 c) 0.9 d) 1.1

2) Statement I : Cu displaces H_2 gas from dilute acids
   Statement II : Cu^{+2} ions get reduced more easily than H^+ion.
   a) Both Statement I and II are correct
   b) Both statement I & II are incorrect
   c) Statement I is correct & Statement II incorrect
   d) Statement I is incorrect & Statement II correct

3) The unit of rate constant for zero order reaction
   a) LS^{-1} b) $Lmol\ S^{-1}$ c) $mol\ L^{-1}\ S^{-1}$ d) $mol\ S^{-1}$

4) The radio active substance reduced to 1/4th of initial concentration in 20 min, then time taken to reduce to 1/16th of the initial concentration is
   a) 60 min b) 120 min c) 40 min d) 15 min

5) The correct order of melting point is
   a) Cr>Mn>Fe b) Fe>Mn>Cr c) Cr>Fe>Mn d) Mn>Fe>Cr

6) One mole of a coordination compound gives three moles of AgCl on treating with $AgNO_3$ solution. The formula of the compound is
   a) $[CO(NH_3)_6\ Cl]\ Cl_3$ b) $[CO(NH_3)_6\ Cl]\ Cl_2$
   c) $[CO(NH_3)_4\ Cl_2]\ Cl$ d) $[CO(NH_3)_{66}]\ Cl$

7) Square planar complex of the type [MABXL] (where A, B, X, L are unidentate) shows
   a) Two C is and one Trans b) Two C is and Two Trans
   c) One C is and two Trans d) One C is and one Trans

8) The IUPAC name of tertiary butyl chloride is
   a) 2 - chloro - 2 - methyl propane b) 3 - chloro butane
   c) 4 - chloro butane d) 2 - chloro - 3 - methyl propane

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9) The product/s formed when phenol is treated with excess of bromine water is /are
(i) O-bromo phenol (ii) P-bromo phenol
(iii) picric acid (iv) 2, 4, 6-tribromo phenol
a) only (iii) b) only (iv) c) both (i) and (ii) d) only (ii)

10) The compound that reacts faster with Lucas reagent at room temperature is
a) butan-1-ol b) butan-2-ol
c) 2-methyl propan-1-ol d) 2-methyl propan-2-ol

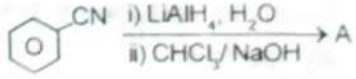
11) An organic compound with the molecular formula $C_9H_{10}O$ forms 2, 4-DNP derivative, reduces Tollen's reagent and undergoes Cannizzaro reaction. On vigorous oxidation, it gives 1, 2-benzene dicarboxylic acid. The organic compound is
a) 3-ethyl benzaldehyde b) 2-ethyl benzaldehyde
c) 4-ethyl benzaldehyde d) 2, 3-dimethyl benzaldehyde

12) Match the following given in List I with List II

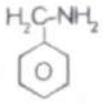
List-I	List-II
A) Gatterman-Koch reaction	i) $SnCl_2$, HCl / H_3O^+
B) Stephen reaction	ii) CrO_2Cl_2 / H_3O^+
C) Rosen mund reaction	iii) CO, HCl / Anhyd $AlCl_3$
D) Etard reaction	iv) H_2 / pd-$BaSO_4$

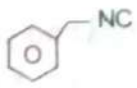
a) A - (iv) B - (iii) C - (ii) D - (i)
b) A - (iii) B - (i) C - (iv) D - (ii)
c) A - (iii) B - (i) C - (ii) D - (iv)
d) A - (iii) B - (ii) C - (iv) D - (i)

13) The IUPAC name of an amine $(CH_3)_2$ -N - CH_2 - CH_2 - CH_3
a) N, N - Dimethyl ethanamine b) N, N - Dimethyl propanamine
c) I, 1 - Dimethyl propanamine d) N-Ethyl - N - methylethanamine

14) The product formed from the following reaction sequence is 

a) 

b) 

c) 

d) 

15) Which one given below is a non-reducing sugar.
a) Maltose b) Lactose c) Glucose d) Sucrose

II. Fill in the blanks by choosing the appropriate word from those given in the brackets : 5X1=5
(cobalt, phosgene gas, instantaneous, methanol, two)

16) The rate at a particular moment of time is expressed as ..... rate of reaction.
17) Vitamin B_{12} is a coordination compound of ..... metal.
18) The poisonous gas ..... formed when chloroform is exposed to air and light for long time.
19) The chemical name of wood spirit is .....
20) Tripeptide contains ..... peptide linkage.

PART-B

III. Answer ANY THREE of the following. Each questions carries two marks. 3X2=6

21) What are Isotonic solutions ? What happens when such solutions are separated by semipermeable membrane.

22) What are homoleptic complexes ? Give one example.

23) Explain Swartz reaction with an example.

24) Explain Riemer-Tiemann reaction.

25) What is Zwitter ion ? Write its general formula.

PART-C

IV. Answer ANY THREE of the following. Each questions carries three marks. 3X3=9

26) What are interstial compounds ? Write any two characteristics of interstial compounds.

27) Write the balanced chemical equation for the manufacture of $K_2Cr_2O_7$ from chromite ore.

28) Study of actinoid elements is more difficult ? Give any three reasons.

29) For the complex, mercury (I), tetra thiocyanato - S - cobaltate (III)
   a) What is coordination number of Co.
   b) Identify the ligand present in this complex.
   c) Does Ionization isomer for the following compound exist ?

30) On the basis of valence bond theory (VBT) explain hybridisation, geometry and magnetic property of $[CoF_6]^{3-}$.

V. Answer ANY TWO of the following. Each questions carries three marks. 2X3=6

31) Write any three differences between positive and negative deviations of Non-Ideal solutions.

32) State Kohlrausch's law of Independent migration of ions. Mention two applications of it.

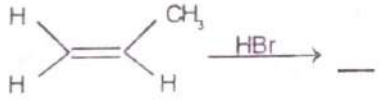
33) For a standard Hydrogen electrode (SHE),
   a) Draw a neat labelled diagram
   b) Write its half cell representation
   c) Mention the value of its potential

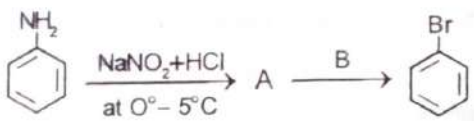
34) Derive an integrated rate equation for a first order reaction.

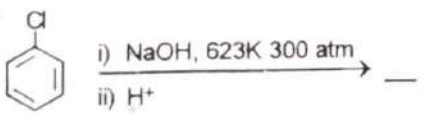
PART-D

VI. Answer ANY FOUR of the following. Each questions carries five marks. 4X5=20

35) a) Complete the following equations :

i) 

ii) 

iii) 

b) Explain Saytzeff rule with an example. (3+2)

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36) a) Write the mechanism of acid catalysed dehydration of ethanol to ethene.
b) Explain the preparation of anisole by Williamson synthesis. (3+2)

37) a) How does propanone reacts with hydrazine ?
b) Explain Cannizaro's reaction taking benzaldehyde as an example. Write equation.
c) What is Tollen's reagent. (2+2+1)

38) a) A Grignard reagent ' X' reacts with CO_2 (dry ice) followed by acid hydrolysis gives ethanoic acid. Write the chemical equation and name the compound 'X'.
b) Explain Hell-Volhard-Zelinsky (HVZ) reaction with an example. (3+2)

39) a) Explain Hinsberg's test of differentiation of primary, secondary and tertiary amines.
b) How is methanamine prepared by Hoffmann's bromamide degradation reaction. (3+2)

40) a) Write the Haworth's structure of maltose.
b) Explain with reaction to show that glucose contains
i) 6 carbon atoms present in straight chain
ii) presence of 5-OH groups.
c) Name the hormone which regulates blood sugar level. (2+2+1)

PART-E (Numerical Problems)

VII. Answer ANY THREE of the following. Each questions carries three marks. 3X3=9

41) 100 g of liquid A (molar mass 140 $gmol^{-1}$) was dissolved in 1000g of liquid B (molar mass 180 $gmol^{-1}$) The vapour pressure of pure liquid B was found to be 500 torr. Calculate the vapour pressure of pure liquid A and its vapour pressure in the solution if the total vapour pressure of the solution is 475 torr.

42) A 5% solution (w/w) of Canesugar ($C_{12}H_{22}O_{11}$) in water has freezing point of 271K. Calculate the freezing point depression constant. Given; freezing point of pure water is 273.15K.

43) Calculate the E.M.F of the cell in which the following reaction takes place;

$$Ni(S) + 2Ag^{+} \longrightarrow Ni^{+2} + 2Ag(s)$$
$$(0.002M) \quad (0.160M)$$

Given $E^{\circ}cell=1.05V$)

44) Two electrolytic cells A and B containing solutions of $AgNO_3$ and $CuSO_4$ respectively are connected in series. A steady current of 1.5 amperes was passed through them until 1.45g of silver is deposited at the cathode of cell A. How long did the current flow and what mass of copper was deposited ? [Atomic mass of copper=63.5 and silver=108]

45) Show that for first order reaction, t99.9%=10 t 50%.

46) The rate constant of a reaction is given by $\log K=13.25-\frac{(1.28\times10^{3})K}{T}$

Calculate the activation energy and pre-exponential factor (A).

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Collection Of Question Papers For POCKET MARKS 70/70

Govt. Of Karnataka

Deputy Director of School Education & Literacy (PU College), Yadagiri

SECOND YEAR PUC Preparatory EXAMINATION JANUARY - 2025

TIME : 3.00 Hours | CHEMISTRY (34) | Max Marks : 70

DISTRICT : YADAGIRI

Instructions :

1) The question paper has 5 parts having 52 questions. All parts are compulsory.
2) a. Part - A carries 20 Marks. Each question carries One mark.
   b. Part - B carries 06 Marks. Each question carries Two marks.
   c. Part - C carries 15 Marks. Each question carries Three marks.
   d. Part - D carries 20 Marks. Each question carries five marks.
   e. Part - E carries 09 Marks. Each question carries Three marks.
3) In part-A questions, first attempted answer will be considered for for awarding marks.
4) Write balanced equations and draw neat labelled diagrams and graphs wherever necessary.
5) Direct answers to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.
6) Use log tables and simple calculator of necessary. (use of scientific calculator is not allowed).
7) for a question having circuit diagram / figure / graph / diagram, alternate questions are given at the end of question paper in a separate section for visually challenged students.

PART - A

I. Select the correct option from the given choice 15×1=15

1. Which of the following modes of expressing concentration is dependent of temperature ?
   a) molarity b) mole fraction c) molality d) parts per million
2. Which of the following is the example for inert electrode ?
   a) Copper electrode b) Gold electrode c) Zinc electrode d) Silver electrode
3. All natural and artificial radioactive delay of unstable nuclei takes place by;
   a) Half order Kinetics b) Second order Kinetics c) First order Kinetics d) zero order Kinetics
4. What is the order of reaction whose rate expression is Rate = $k[A]^{3/2}[B]^{-1}$?
   a) Second order b) First order c) Zero order reaction d) Half order
5. Which of the following statement is not correct?
   a) Scandium does not exhibit Variable oxidation states b) Brass is an alloy of copper & Zinc
   c) Actinoid contraction is greater than lathanoid contraction d) mn^{3+} is colourless
6. The transition metal present in red pigment of blood haemoglobin is
   a) Cobalt b) Nickel c) Iron d) Copper
7. The geometry of the complex $[Fe(CO)_4]$ is;
   a) Octahedral b) Tetrahedral c) Trigonal bipyramidal d) square pyrimidal
8. The method of preparation of an alkyl fluoride by treating alkyl chloride with metallic fluoride is;
   a) Finkelstein reaction b) Wurtz reaction c) Swartz reaction d) Fittig reaction
9. When phinol is treated with consantrated HNO_3 forms;
   a) Anisole b) Picric acid c) Aspirin a) Salicylic acid
10. Denatured alcohol is;
    a) Ethanol + methanol b) Recbfied spirit + methanol + pyridine
    c) Rectified spirit d) Distilled ethanol
11. The carboxylic acids have higher boiling points than aldehydes, Ketones and alcohols due to
    a) Intramolecular hydrogen bonding b) Vanderwall's force of attraction
    c) dative bond d) Intermolecular hydrogen bonding.
12. The reagent useful for separation and purification of aldehyde is,
    a) Silver nitrate solution b) Sodium hydrogen sulfite c) Fehling solution d) Sodium sulfite
13. Hinsberg's reagent is;
    a) Chlorobenzene b) Benzene carbonyl Chloride
    c) Chloroform d) Benzene Sulphonyl chloride.
14. The correct order of basic strength in case of ethyl substituted amines in aqueous solution is;
    a) $(C_2H_5)_2NH > (C_2H_5)_3N > C_2H_5NH_2 > NH_3$ b) $(C_2H_5)_3N > (C_2H_5)_2NH > C_2H_5NH_2 > NH_3$
    c) $NH_3 > (C_2H_5)_2NH > C_2H_5NH_2 > (C_2H_5)_3NH > NH_3$ d) $(C_2H_5)_3N > C_2H_5NH_2 > (C_2H_5)_2NH > NH_3$
15. Chemical bond present between two nucleotide is;
    a) peptide bond b) phosphodiester bond c) Glycosidic bond d) Amide bond

Fill in the blanks by choosing the appropriate word from those given in the brackets 5×1=5
(Gycogen, Arrhenius equation, phosgene, +3, SN^2, SN^1)

16. The temperature dependence of the rate of a chemical reaction is explained by.....
17. The stable oxidation state of lanthanoids is.....
18. Williamson's synthesis of preparing dimethyl ether involves..... reaction for the attack of a methoxide ion on methyl chloride.
19. Carbonyl chloride is also known as.....
20. .....is known as animal starch.

PART – B

Answer any Three of the following. Each question carries TWO marks 3×2=6

21. State Henry's law and give any one of its application?
22. Name an important alloy, which contains maximum percentage of the lanthanoid metals. Mention one of its use?

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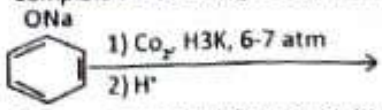
23. Explain wurtz-fitting reaction.

24. complete the following reaction and name the reaction?



25. Give an example for female sex hormone and write its function

PART – C

V. Answer any THREE of the following. Each question carries Three marks 3×3=9

26. Explain the preparation of potassium permanganate from pyralusite ore? What is the colour of $KMnO_4$ Grystals?
27. Calculate the spin only magnetic moment of Calculate the spin only magnetic moment of Cu^{2+} ion (Atomic number of copper is 29)
28. Using Valence bond theory, explain geometry, hybridisation and magnetic property of $[Ni(CN)_4]^{2-}$ ion (Atomic No. of nickel is 28)
29. Write number of donor sites of following ligands; a) en b) EDTA c) PPh_3
30. Explain crystal field splitting in tetrahedral complexes using energy level diagram?

V. Answer any TWO of the following. Each question carries Three marks 2×3=6

31. Give any three differences between ideal & non-ideal solutions.
32. State Kohlrasch's law of independent migration of ions. Mention two application of it.
33. What is the chemical composition of rust ? Write the equations of anodi and cathodic reactions occur during rusting?
34. Define the following terms : a) Activation energy, b) collision frequency, c) Effective collision

PART – D

VI Answer any Four of the following. Each question Carries five marks. 4x5=20

35 a) Write the mechanism involved in the conversion of 2-bromo- 2-methylpropane to 2-methylpropan-2-ol.
b) What are enantiomers? Name one physical property which differs enantiomers? (3+2)

36 a) Give the mechanism involved in the acid catalysed hydration of C_2H_4 to C_2H_5OH.
b) Complete the following; (3+2)

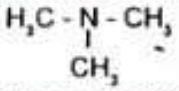


2

37 a) An organic compound with molecular formula C_6H_5Br on treatment with Mg. in dry ether gives compound 'A', on treatment with Co_2 (dry ice) to form an addition compound 'B'. Then 'B' on hydrolysis gives 'C'. Identify the compound A, B and C
b) Explain Clemmensen's recluction with an example (3+2)

38 a) Explain aldol conclensation reaction with an example
b) Explain Hell-volhard-Zelinsky reaction with an example (3+2)

39 a) Give the preparation of p-hydroxyazobenzene
b) Explain Carbylamine reaction with an example
c) Give IUPAC name of the following compound. (2+2+1)



40 a) Give any two differences between amylose & amylopectin.
b) Name any two main forces which stabilize the secondary and tertiary structures of proteins
c) Deficiency of which vitamin causes Cheilosis disease (2+2+1)

PART – E (Numerical problems)

VII. Answer ANY THREE of the following. Each question Carries three marks each 3x3=9

41. 0.3L of an aqueous solution contains 1.89 g of the protein. At 300k, the osmotic pressure of this solution was found to be 2.57×10^{-3} bar. Calculate the molar mass of the protein.(R=0.083L bar $mol^{-1}k^{-1}$)
42. Heptane and octane form an ideal solution. At 373K, the Vapour pressure of the two liquid components are 105.2kpa and 46.8 Kpa respectively. Calculate the vapour pressure of a solution containing of 26.0g of heptane & 35g of Octane. (molar mase of heptane 100gmol⁻¹ & molar mass of octane 114 g/mol).
43. Conductivity of 0.00241 m acetic and is 7.896×10^{-5} Sem^{-1}. calculate its molar conductivity. If λ°_m for acetic acid is 390.5 Sem^2 moe^{-1} What is its degree of dissociation ?
44. Calculate the Gibbs free energy change for the cell reactions.

$$2Fe^{3+}_{(aq)} + 2I^-_{(aq)} \longrightarrow 2Fe^{2+}_{(aq)} + I_{2(s)}$$

Given : $E^{\circ}_{(Fe^{3+}/F2^{2+})} = 0.77V$, $E^{\circ}_{(1/2\,I_2/I)} = 0.54V$.

45. The rate constant for a reaction is $60S^{-1}$. How much time will it take to reduce the initial concentriation of the reactant of its 1/16th Value ?
46. The decomposition of A into product has value of K as $4.5 \times 10^{3}s^{-1}$ at 283 K and energy of activation 60 $KJmol^{-1}$. At what temperature would K be $1.5 \times 10^{4}S^{-1}$? (R= 8.314$Jk^{-1}mol^{-1}$)

3 Set of Blue Prints and 3 Set of MQPs Published By Board

SUBJECT: CHEMISTRY-34 **BLUE PRINT-1** **CLASS: II PUC**

Question Paper Part	Question Type	Number of Questions	Marks
PART - A	MCQ's	15/15	15/15
PART - A	Fill in the blanks	05/05	05/05
PART -B	Short Answer (SA = 02 Marks)	03/05	06/10
PART - C	Short Answer (SA = 03 Marks) Inorganic Chemistry	03/05	09/15
PART - C	Short Answer (SA = 03 Marks) Physical Chemistry	02/04	06/12
PART- D	Long Answer (LA = 05Marks)	04/06	20/30
PART - E	Short Answer (SA = 03Marks) **Numerical problems**	03/06	09/18
	Total	**35/46**	**70/105**

WEIGHTAGE

Objectives	Number of Questions	Marks	Percentage
Remember	18	40	**≈ 40%**
Understanding	13	32	**≈ 30%**
Apply	06	12	**≈ 10%**
Hots	09	21	**≈ 20%**
Total	**46**	**105**	**100%**

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SUBJECT: CHEMISTRY (34) **BLUE PRINT-1** **CLASS: II PUC**

Chapter/ Contentdomain/ Unit/ Theme	Numberof hours	Marks	LOTS (≈ 80%)												HOTS (≈ 20%)			
			Remember (≈ 40%)				Understand (≈ 30%)				Apply (≈ 10%)							
			VSA 1M	SA 2M	SA 3M	LA 5M	VSA 1M	SA 2M	SA 3M	LA 5M	VSA 1M	SA 2M	SA 3M	LA 5M	VSA 1M	SA 2M	SA 3M	LA 5M
Physical Chemistry																		
1. Solutions	14	**12**	1		1				1NP		1				1		1NP	
2. Electrochemistry	14	**13**			1				1		1		1NP				1NP	
3. Chemical Kinetics	14	**12**	1	1					1				1NP				1NP	
Inorganic Chemistry																		
4. The d & f - Block Elements	12	**10**	1	1	1		1										1	
5. Coordination Compounds	12	**11**	1		1				1				1		1			
Organic Chemistry																		
6. Haloalkanes and Haloarenes	10	**09**	1			1		1							1			
7. Alcohols, Phenolsand Ethers	12	**10**	1				1	1		1	1							
8. Aldehydes, Ketones and Carboxylic Acids	14	**12**	1			1									1			1
9. Amines	08	**07**	1				1			1								
10. Biomolecules	10	**09**	1			1	1	1										
Total Teaching Hours & Marks	**120**	**105**	**9**	**4**	**12**	**15**	**4**	**6**	**12**	**10**	**3**		**09**		**4**		**12**	**5**
Total Questions		**46**	**09**	**02**	**04**	**03**	**04**	**03**	**04**	**02**	**03**	**00**	**03**	**00**	**04**	**00**	**04**	**01**

1. Weightage = Total marks/Number of teaching hours = 105/120 = 0.875 (i.e., 0.875marks for each hour)
2. Choice = out of **46** Questions only **35** Questions are to be answered.

Note: NP = Numerical Problems; VSA = Very Short Answer (MCQ's and Fill in the Blanks); SA= Short Answer; LA = Long Answer

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GENERAL GUIDE LINES:

1. Questions should not be vague and ambiguous. **Answers or concept should be available in the prescribed NCERT text book** or based on the contents in the prescribed text book.
2. Intermixing of questions of different units is not allowed. 5 marks question may be framed as (3+2) as far as possible.
3. Avoid questions from:
   a. Drawings involving 3D diagrams
   b. The boxed materials with deep yellow bar in the text book are to bring additional life to the topic and are non-evaluative.
4. Questions on numerical data given in the form of appendix, numbered tables containing experimental data and life history of scientists given in the chapters should be avoided.
5. Frame the questions in such a way to strictly avoid ½ mark evaluation (or avoid value points for ½ marks.).
6. While framing Physical chemistry units (Unit 1, 2 & 3) questions for Part -A, B and C should not be Numerical problems. The Numerical Problems of these Units should be framed only in Part-E. This division is done to make for the students to learn and attempt to solve the Numerical Problems.
7. Application and HOTS (Higher Order Thinking Skills) questions can be selected from any chapter without changing the weightage of the chapter.

GOVERNMENT OF KARNATAKA

KARNATAKA SCHOOL EXAMINATION & ASSESSMENT BOARD

MODEL QUESTION PAPER – 1

Class: II Year PUC | **Academic Year:** 2024-25

Subject: Chemistry (34) | **Maximum Marks:** 70

Time: 3.00 Hours | **No. of Questions:** 46

Instructions

1. Question paper has FIVE parts. All parts are compulsory.
2. a. Part-A carries 20 marks. Each question carries 1 mark.
   b. Part-B carries 06 marks. Each question carries 2 marks.
   c. Part-C carries 15 marks. Each question carries 3 marks.
   d. Part-D carries 20marks. Each question carries 5 marks.
   e. Part-E carries 09 marks. Each question carries 3 marks.
3. In Part-A questions, **first attempted answer** will be considered for awarding marks.
4. Write balanced chemical equations and draw neat labeled diagrams and graphs wherever necessary.
5. Direct answers to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.
6. Use log tables and simple calculator if necessary (use of scientific calculator is not allowed).
7. For a question having circuit diagram/figure/ graph/ diagram, alternate questions are given at the end of question paper in a separate section for visually challenged students.

PART-A

I. Select the correct option from the given choices. **15 ×1 = 15**

1. The role of CO_2 in Kolbe's reaction is
   a) acts as catalyst b) act as nucleophile
   c) act as weak electrophile d) act as strong electrophile.
2. In DNA, the linkage between different nitrogenous bases is
   a) phosphate linkage b) glycosidic linkage
   c) peptide linkage d) hydrogen bonding.
3. The complex $PtCl_2.4NH_3Br_2$ is treated with excess of $AgNO_3$ solution, two mole of AgBr is precipitated. The primary and secondary valence of this complex is
   a) 6 and 1 b) 6 and 2
   c) 4 and 6 d) 3 and 6
4. **Statement I:** Enantiomers are non-superimposable mirror images on each other.
   Statement II: A racemic mixture shows zero optical rotation.
   Identify the correct statement
   a) Both statement I and II are correct
   b) Both statement I and II are incorrect
   c) Statement I is correct and statement II is incorrect.
   d) Statement I is incorrect and statement II is correct.
5. The most stable manganese compound is
   a) Mn_2O_7 b) MnF_4 c) MnO_2 d) $MnSO_4$

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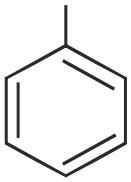
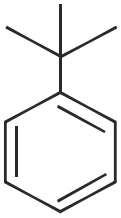
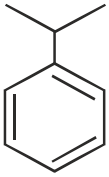
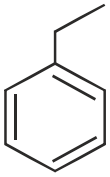
6. Among the following alkyl benzenes which one will not give the benzoic acid on oxidation with acidic $KMnO_4$ solution.

a) 

b) 

c) 

d) 

7. An ambidentate ligand is

a) Cl^- b) CN^-

c) OH^- c) NO_2^+

8. The E^o of Fe^{2+}/Fe, Zn^{2+}/Zn and Sn^{2+}/Sn are –0.44 V, –0.76 V and –0.14 V respectively. Which metal/s is/are act as sacrificial electrode to protect iron from rusting?

a) Both Zn and Sn b) Zn only

c) Sn Only d) neither Zn nor Sn.

9. The chemical name of phosgene is

a) chromyl chloride b) triphenylphosphine

c) phosphorusoxychloride d) carbonyl chloride.

10. In a solution containing non-volatile solute, the mole fraction of solvent is 0.9. The relative lowering of vapour pressure is

a) 1 b) 0.1

c) 0.9 d) 1.1

11. All natural and artificial radioactive decay of unstable nuclei take place by

a) zero order kinetics b) half order kinetics

c) first order kinetics d) second order kinetics

12. Match the following

List-I	List-II
A) Glucocorticoids	i) Responsible for development of secondary female characteristics.
B) Mineralocorticoids	ii) Responsible for preparing the uterus for implantation of fertilised egg
C) Testosterone	iii) Control carbohydrates metabolism
D) Estradiol	iv) Responsible for development of secondary male characteristics.
	v) Control level of excretion of water and salt by kidney.

a) A-(iv), B- (v), C-(ii), D-(i) b) A-(iii), B-(v), C-(iv), D-(i)

c) A-(ii), B-(i), C-(v), D-(iv) d) A-(iii), B-(ii), C-(iv), D-(i)

13. p-Aminoazobenzene is prepared from benzenediazonium chloride and aniline in

a) acidic medium b) basic medium

c) neutral medium d) both acidic and basic medium.

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14. The chemicals used to convert commercial alcohol into denatured alcohol are

a) $CuSO_4$ and Pyrolidine b) Cu_2S and Pyrolidine

c) $CuSO_4$ and Pyridine d) Cu_2S and Pyridine.

15. During osmosis, the solvent molecules are moving from

a) Hypotonic solution to hypertonic solution

b) Hypertonic solution to hypotonic solution

c) Higher concentrated solution to lower concentrated solution

d) Higher osmotic pressure solution to lower osmotic pressure solution.

II. **Fill in the blanks by choosing the appropriate word from those given in the brackets:**

(aldehydes, phenol, fluorobenzene, decreases, greater, benzene) **5×1= 05**

16. The melting point of interstitial compound is _____ than the pure metal.

17. Benzenediazonium fluoroborate on heating decomposes to give_____

18. The simplest hydroxy derivative of benzene is _____

19. When a non-volatile solute is added to the pure solvent, the freezing point of solvent_____

20. Ozonolysis of alkenes followed by reaction with zinc dust and water gives ____

PART-B

III. Answer ANY THREE of the following. Each question carries two marks. **3 × 2 = 06**

21. Explain Swartz reaction with an example.

22. Write the reactions show that glucose contains a) five hydroxyl groups b) aldehyde group.

23. Define half-life period of a reaction. Write the relationship between half-life period and initial concentration of zero order reaction.

24. Write the reactions involved in preparation of phenol from cumene.

25. Iron (III) catalyses the reaction between iodide and persulphate ions in the reaction:

$$2I^- + S_2O_8^{2-} \longrightarrow I_2 + 2SO_4^{2-}.$$

Explain the catalytic action of catalyst iron (III) by using chemical reactions.

PART-C

IV. Answer ANY THREE of the following. Each question carries three marks. **3 × 3 = 09**

26. Study of actinoids elements is more difficult? Give any three reasons.

27. For the complex, Mercury (I) tetrathiocyanato-S-cobaltate (III)

a) What is coordination number of Co.

b) Identify the ligand present in this complex.

c) Does ionization isomer for the following compound exist?

28. A student of 2nd PU performs two trails of reactions between KI and $KMnO_4$. In first trail student add small amount of acid to reaction mixture and in second trail student forgot to add acid to reaction mixture. Then student observed that different colour was obtained in first and second trail. Give reason for above observation. Write the possible chemical reactions to both the trails.

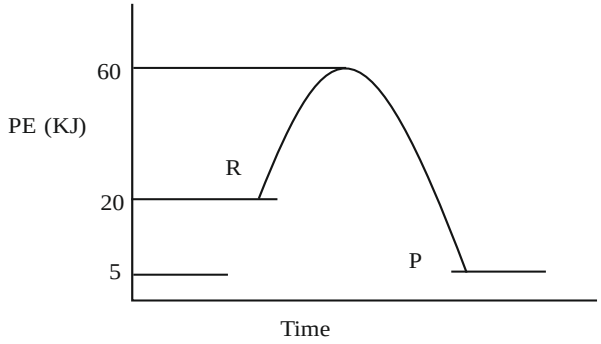
29. Define Crystal field splitting. Sketch the energy level diagram for the crystal field splitting of d-orbital in a tetrahedral complex.

30. What is the significance of synergic effect in metal carbonyls? How many bridged and non-bridged CO (carbonyl) ligands are present in octacarbonyldicobalt (0) complex compound?

V. Answer ANY TWO of the following. Each question carries three marks. **2 × 3 = 06**

31. Direct measurement of conductivity of ionic solutions by Wheatstone bridge is not possible. Give reasons. Suggest a remedy to resolve it.

32. For the reaction R(s) → P(g), the potential energy diagram is given below:



By observing the above diagram, answer the following.

a) What is the value of activation energy of the reaction?

b) What is the value of ΔH of the reaction?

c) Draw potential energy diagram for the reaction P(g) → R(s).

33. State Faraday's II law of electrolysis. Mention any two factors which determines the product of electrolysis.

34. Name the two components present in binary solution. Which component determines the physical state of binary solution?

PART-D

VI. Answer ANY FOUR of the following. Each question carries five marks. **4 × 5 = 20**

35. a) How do you distinguish between primary, secondary and tertiary amines by using Hinsberg's reagent with chemical equations involved?

b) Give the preparation of p-hydroxyazobenzene. (3+2)

36. a) Between methanal and ethanal, which would undergo aldol condensation? Write the chemical reaction involved in it.

b) Although phenoxide ion has more number of resonating structures than carboxylate ion, carboxylic acid is a stronger acid than phenol. Why? (3+2)

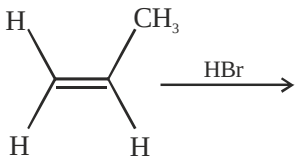
37. a) What is peptide bond? Give an example for dipeptide.

b) What are oxidoreductase enzymes? Name the enzyme that catalyses hydrolysis of maltose into glucose

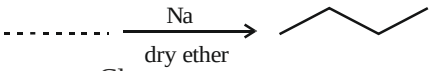
c) Give any one main natural source of Vitamin K? (2+2+1)

38. a) Complete the following equation:

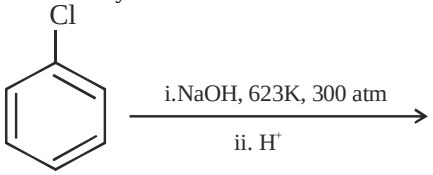
i)



ii)



iii)



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b) Explain Saytzeff rule with an example. (3+2)

39. a) Give the chemical equation for the Conversion of propanenitriles into corresponding ketones by using phenyl magnesium bromide. Write the IUPAC name of the product.

b) Explain Hell-Volhard-Zelinsky (HVZ) reaction with an example. (3+2)

40. a) Write the reaction involved in the mechanism of acid catalyzed dehydration of alcohol to alkene.

b) Explain the preparation of anisole by Williamson synthesis. (3+2)

PART–E

(NUMERICAL PROBLEMS)

VII. Answer ANY THREE of the following. Each question carries three marks. 3 × 3 = 09

41. Show that in a first order reaction, time required for completion of 99.9% is 10 times of half-life ($t_{1/2}$) of the reaction.

42. A 5% solution (w/w) of cane sugar ($C_{12}H_{22}O_{11}$) in water has freezing point of 271 K. calculate the freezing point depression constant. Given freezing point of pure water is 273.15 K.

43. The molar conductivity of 0.025 mol L^{-1} methanoic acid is 46.1 S cm^2 mol^{-1}. Calculate its degree of dissociation. Given $\lambda^{o}_{(H^+)} = 349.6 \text{ S cm}^2 \text{ mol}^{-1}$ and $\lambda^{o}_{(HCOO^-)} = 54.6 \text{ S cm}^2 \text{ mol}^{-1}$.

44. Henry's law constant for the molality of methane in benzene at 298 K is 4.27 × 10^5 mm Hg. Calculate the mole fraction of methane in benzene at 298 K under 760 mm Hg.

45. Two electrolytic cells A and B containing solutions of $AgNO_3$ and $CuSO_4$ respectively are connected in series. A steady current of 1.5 amperes was passed through them until 1.45 g of silver is deposited at the cathode of cell A. How long did the current flow and What mass of copper was deposited? [Atomic mass of copper = 63.5 and silver = 108].

46. The rate constant of a reaction is given by: $\log k = 13.25 - \frac{(1.28\times10^3)K}{T}$. Calculate the activation energy and pre-exponential factor (A).

PART – F

(For visually challenged students only)

32. Give any three factors which affect a rate of reaction. 3

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Collection Of Question Papers For POCKET MARKS 70/70

SUBJECT: CHEMISTRY-34 **BLUE PRINT - 2** **CLASS: II PUC**

Question Paper Part	Question Type	Number of Questions	Marks
PART - A	MCQ's	15/15	15/15
PART - A	Fill in the blanks	05/05	05/05
PART -B	Short Answer (SA = 02 Marks)	03/05	06/10
PART - C	Short Answer (SA = 03 Marks) Inorganic Chemistry	03/05	09/15
PART - C	Short Answer (SA = 03 Marks) Physical Chemistry	02/04	06/12
PART- D	Long Answer (LA = 05Marks)	04/06	20/30
PART - E	Short Answer (SA = 03Marks) **Numerical problems**	03/06	09/18
	Total	**35/46**	**70/105**

WEIGHTAGE

Objectives	Number of Questions	Marks	Percentage
Remember	**19**	**41**	**≈ 40%**
Understanding	**12**	**31**	**≈ 30%**
Apply	**05**	**11**	**≈ 10%**
Hots	**10**	**22**	**≈ 20%**
Total	**46**	**105**	**100%**

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SUBJECT: CHEMISTRY (34) BLUE PRINT-2 CLASS: II PUC

Chapter/ Content domain/ Unit/ Theme	Number of hours	Marks	LOTS (≈ 80%)												HOTS (≈ 20%)			
			Remember (≈ 40%)				Understand (≈ 30%)				Apply (≈ 10%)							
			VSA 1M	SA 2M	SA 3M	LA 5M	VSA 1M	SA 2M	SA 3M	LA 5M	VSA 1M	SA 2M	SA 3M	LA 5M	VSA 1M	SA 2M	SA 3M	LA 5M
Physical Chemistry																		
1. Solutions	14	12	1		1			1					1NP				1NP	
2. Electrochemistry	14	13			1				1				1NP		1		1NP	
3. Chemical Kinetics	14	12	1				1		1		1		1NP				1NP	
Inorganic Chemistry																		
4. The d & f - Block Elements	12	10	1		2				1									
5. Coordination Compounds	12	11	1	1	1		1								1		1	
Organic Chemistry																		
6. Haloalkanes and Haloarenes	10	09	1	1		1					1							
7. Alcohols, Phenols and Ethers	12	10	1	1			1			1					1			
8. Aldehydes, Ketones and Carboxylic Acids	14	12					1			1					1			1
9. Amines	08	07	1			1									1			
10. Biomolecules	10	09	1	1			1			1								
Total Teaching Hours & Marks	120	105	8	8	15	10	5	2	9	15	2		09		5		12	5
Total Questions		46	8	4	5	2	5	1	3	3	2	0	3		5	0	4	1

1. Weightage = Total marks/Number of teaching hours = 105/120 = 0.875 (i.e., 0.875marks for each hour)
2. Choice = out of **46** Questions only **35** Questions are to be answered.

Note: NP = Numerical Problems; VSA = Very Short Answer (MCQ's and Fill in the Blanks); SA= Short Answer; LA = Long Answer

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GENERAL GUIDE LINES:

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2. Intermixing of questions of different units is not allowed. 5 marks question may be framed as (3+2) as far as possible.
3. Avoid questions from:
   a. Drawings involving 3D diagrams
   b. The boxed materials with deep yellow bar in the text book are to bring additional life to the topic and are non-evaluative.
4. Questions on numerical data given in the form of appendix, numbered tables containing experimental data and life history of scientists given in thechapters should be avoided.
5. Frame the questions in such a way to strictly avoid ½ mark evaluation (or avoid value points for ½ marks.).
6. While framing Physical chemistry units (Unit 1, 2 & 3) questions for Part -A, B and C should not be Numerical problems. The Numerical Problems ofthese Units should be framed only in Part-E. This division is done to make for the students to learn and attempt to solve the Numerical Problems.
7. Application and HOTS (Higher Order Thinking Skills) questions can be selected from any chapter without changing the weightage of the chapter.

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MODEL QUESTION PAPER – 2

Class: II Year PUC | **Academic Year:** 2024-25

Subject: Chemistry (34) | **Maximum Marks:** 70

Time: 3.00 Hrs | **No. of Questions:** 46

Instructions

1. Question paper has FIVE parts. All parts are compulsory.
2. a. Part-A carries 20 marks. Each question carries 1 mark.
   b. Part-B carries 06 marks. Each question carries 2 marks.
   c. Part-C carries 15 marks. Each question carries 3 marks.
   d. Part-D carries 20marks. Each question carries 5 marks.
   e. Part-E carries 09 marks. Each question carries 3 marks.
3. In Part-A questions, **first attempted answer** will be considered for awarding marks.
4. Write balanced chemical equations and draw neat labeled diagrams and graphs wherever necessary.
5. Direct answers to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.
6. Use log tables and simple calculator if necessary (use of scientific calculator is not allowed).
7. For a question having circuit diagram/figure/ graph/ diagram, alternate questions are given at the end of question paper in a separate section for visually challenged students.

PART-A

I. Select the correct option from the given choices. **15 × 1 = 15**

1. Square planar complex of the type [MABXL] (where A, B, X, L are unidentate) shows
   a) Two Cis and one Trans
   b) Two cis and Two trans
   c) One Cis and two Trans
   d) one Cis and One Trans

2. Order of a reaction in which unit of rate of reaction and rate constant are same
   a) 0
   b) 1
   c) 1/2
   d) 2

3. **Statement I:** Tertiary alcohols heated with copper at 573 K yields 2-methyl propene.
   Statement II: Tertiary alcohols undergo dehydration when heated with Cu /573K.
   Identify the correct statement
   a) Both statement I and II are correct
   b) Both statement I and II are incorrect.
   c) Statement I is correct and statement II is incorrect.
   d) Statement I is in correct and statement II is correct.

4. The tanks used by most of scuba divers are filled with air diluted with helium of around
   a) 88.3%
   b) 56.2%
   c) 32.1%
   d) 11.7%

5. 1,2-dichloroethane is an example of
   a) alkylene dihalides
   b) alkylidene halides
   c) vinyl dihalides
   d) gem-dihalides.

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6. A galvanic cell has electrical potential of 1.1 V. If an opposing potential of 1.1V is applied to this cell, what will happen to the cell reaction and current flowing through the cell?
   a) The reaction stops and no current flows through the cell.
   b) The reaction continuous but current flows in opposite direction.
   c) The concentration of reactants becomes unity and current flows from cathode to anode.
   d) The cell does not function as a galvanic cell and zinc is deposited on zinc plate

7. As the size of the aldehyde molecule increases, the odour becomes
   a) more pungent b) more fragrant
   c) less fragrant d) no change in the odour.

8. Sulphur containing amino acid is;
   a) cysteine b) tyrosine
   c) histidine d) proline

9. The C-O- bond angles of P, Q and R are found to be 111.7^o, 109°, 108.9^o respectively, compound P, Q and R are
   a) P = Phenol, Q = Methanol, R = Methoxy Methane.
   b) P = Methoxy Methane, Q = Methanol, R = Phenol.
   c) P = Methanol, Q = Phenol, R = Methoxy Methane.
   d) P = Methoxy Methane, Q = Phenol, R = Methanol.

10. Compounds A and B react according to the following chemical equation $2A(g)+B(g)\longrightarrow 2C(g)$ concentration of either A or B were changed by keeping the concentrations of one of the reactants constant and the rates were measured as a function of initial concentration. Following results were obtained. Choose the correct option for the rate equation for this reaction.

Experiment trial	Initial Concentration of [A] mol L^{-1}	Initial Concentration of [B] mol L^{-1}	Initial Concentration of [C] mol L^{-1}
1	0.40	0.40	0.10
2	0.40	0.80	0.40
3	0.80	0.40	0.20

   a) Rate = k $[A]^2[B]$ b) Rate = k $[A]\,[B]^2$
   c) Rate = k [A][B] d) Rate = k $[A]^2$

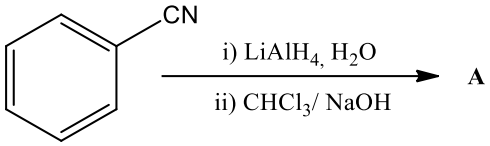
11. The reagent useful for separation and purification of aldehydes is
   a) silver nitrate solution b) sodium hydrogensulphite
   c) Fehling's solution d) sodium sulphate.

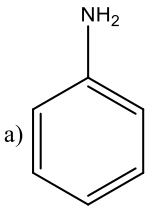
12. Match the following given in column I with Column II

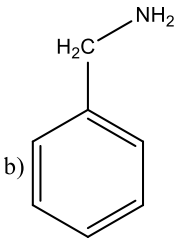
Column -I	Column - II
i) Chloramphenicol	A) Malaria
ii) Chloroquine	B) Anaesthetic
iii) Halothane	C) Typhoid fever
iv) Thyroxine	D) Goiter

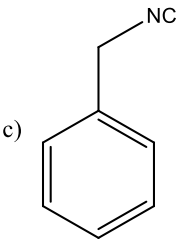
   a) i-C, ii-D, iii-B, iv -A b) i-C, ii-A, iii-B, iv -D
   c) i-D, ii-B, iii-C, iv -A d) i-A, ii-B, iii-C, iv -D

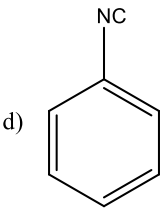
13. The product formed from the following reaction sequence is











14. The magnitude of CFSE (crystal field splitting complex, Δ_0) can be related to the configuration of d-orbitals in a coordination entity is

a) if $\Delta_0 < P$, the configuration is $t^3_{2g}e^1_g$ b) if $\Delta_0 > P$, the configuration is $t^3_{2g}e^1_g$

c) if $\Delta_0 > P$, the configuration is $t^2_{2g}e^2_g$ d) if $\Delta_0 < P$, the configuration is $t^4_{2g}e^0_g$

15. The correct order of melting point is.

a) Cr > Mn > Fe b) Fe >Mn>Cr

c) Cr > Fe >Mn d) Mn> Fe >Cr

II. Fill in the blanks by choosing the appropriate word from those given in the brackets:

(glycogen, starch, catalyst, cobalt, methanol, HNO_2) **5 × 1 = 05**

16. Storage polysaccharide present in animals is _____

17. Vitamin B_{12} is a coordination compound of _____metal

18. Primary aliphatic amines convert into aliphatic alcohols on reacting with _____ solution.

19. The chemical name of wood spirit is _____

20. Change in standard Gibbs free energy (ΔG^0) of a reaction is does not altered by the addition of ___.

PART-B

III. Answer ANY THREE of the following. Each question carries two marks. 3 × 2 = 06

21. Draw a graph to show variation of vapour pressure of solvent and solution with respect to temperature.

22. Explain the preparation of methoxyethane by Willamson's synthesis. Give equation.

23. What are heteroleptic complexes? What is the co-ordination number in complex $[Co(ox)_2Cl_2]^+$.

24. Chlorobenzene cannot be prepared by reacting phenol with $SOCl_2$. Give reasons.

25. What are hormones? Name a hormone that mediate responses to external stimuli.

PART-C

IV. Answer ANY THREE of the following. Each question carries three marks. 3 × 3 = 09

26. When a chromite ore **'A'** is fused with sodium carbonate in free excess of air and the product is dissolved in water, a yellow solution of compound **'B'** is obtained. After treatment of this yellow solution with sulphuric acid compound **'C'** can be crystallize from the solution. When compound **'C'** is treated with KCl orange crystals of compound **'D'** is crystallizes out. Write all the reactions involved in the conversion of **'A'** to **'D'**.

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27. Write the IUPAC name of $[CoCl_2(en)_2]^{+1}$. Draw the geometrical isomers for this complex.
28. Fluorine has ability to stabilize most of transition metal in higher oxidation states. Give two reasons with an example.
29. Write any three limitations of Valence bond Theory (VBT) of coordination compounds.
30. What is lanthanoid contraction? Name two elements of actinoids which exhibits +7 oxidation state in their compounds.

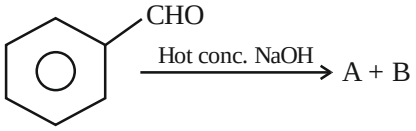
V. Answer ANY TWO of the following. Each question carries three marks. 2 × 3 = 06

31. What is the effect of temperature on the rate constant of reaction? How can this temperature effect on rate constant be represented quantitatively**?**
32. Plot a graph of molar conductivity v/s √c for strong and weak electrolytes in solution. For strong electrolytes, write the equation that represent the variation of molar conductivity with dilution.
33. Write three reasons to justify that osmotic pressure method has the advantage over other colligative methods for the measurement of molar mass of proteins and polymers.
34. During working of Leclanche cell, Write the anodic and cathodic reaction. What is the role of produced ammonia during cell reaction?

PART-D

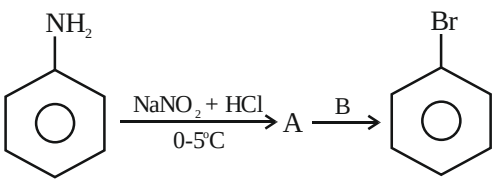
VI. Answer ANY FOUR of the following. Each question carries five marks. 4 × 5 = 20

35. a) Give any two differences between amylose and amylopectin.
    b) Name any two main forces which stabilize the secondary and tertiary structures of proteins.
    c) Which vitamin deficiency causes the increased fragility of RBC's and muscular weakness. (2+2+1)
36. a) Write the mechanism for the addition of HCN to carbonyl compound in the presence of base.
    b) Aromatic carboxylic acid does not undergo Friedel crafts reaction. Give reasons. (3+2)
37. a) Explain Hoffmann broamamide degradation reaction by taking butanamide as an example. Give the IUPAC name of the product.
    b) pK_b of aniline is more than that of methanamine. Give reasons. (3+2)
38. a) How do you prepare phthalimide from aromatic dicarboxylic acid? Give equation.
    b) Complete the following reaction:



(3+2)

39. a) An alkene X (C_3H_6) reacts with H_2O/H^+ to give compound Y, compound Y further undergo reaction with CrO_3-H_2SO_4 to produce compound Z. Write the IUPAC name of compounds X, Y and Z.
    b) Which among the following compounds have lowest and highest pK_a value? (3+2)
    p-nitrophenol, phenol, ethanol and o-cresol.
40. a) Write any three differences between S_N1 and S_N2 reaction mechanisms.
    b) Identify A and B in the given reaction



(3+2)

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PART–E
(NUMERICAL PROBLEMS)

VII. Answer ANY THREE of the following. Each question carries three marks. 3 × 3 = 09

41. Calculate the mass of Vitamin C (ascorbic acid, $C_6H_8O_6$) to be dissolved in 78 g of acetic acid to lower its melting point by 1.5°C. Given: K_f of acetic acid is 3.9 K kg mol^{-1}.

42. Heptane and octane form an ideal solution. At 373 K, the vapour pressures of the two liquid components are 105.2 kPa and 46.8 kPa respectively. Calculate the vapour pressure of a solution containing of 26.0 g of heptane and 35 g of octane.

43. The electrical resistance of a column of 0.05 mol L^{-1} NaOH solution of diameter 1 cm and length 50 cm is 5.55×10^3 ohm. Calculate its resistivity, conductivity and molar conductivity.

44. Calculate the Gibbs free energy change and equilibrium constant for the cell reaction
$2Fe^{3+}(aq) + 2I^- \longrightarrow 2Fe^{2+}(aq) + I_2$. Given $E^o_{(Fe^{3+}/Fe^{2+})} = 0.77$ V and $E^o_{\left(\frac{1}{2}I_2/I^-\right)} = 0.54$ V.

45. The rate of a reaction quadruples when the temperature changes from 293 K to 313 K. Calculate the energy of activation of the reaction assuming that it does not change with temperature.

46. A reaction is first order in A and second order in B.
    (i) Write the differential rate equation.
    (ii) How is the rate affected on increasing the concentration of 'B' three times and decreasing the concentration of 'A' by half times?
    (iii) How is the rate affected when the concentrations of both 'A' and 'B' are tripled?

Collection Of Question Papers For POCKET MARKS 70/70

SUBJECT: CHEMISTRY-34 **BLUE PRINT-3** **CLASS: II PUC**

Question Paper Part	Question Type	Number of Questions	Marks
PART - A	MCQ's	15/15	15/15
PART - A	Fill in the blanks	05/05	05/05
PART -B	Short Answer (SA = 02 Marks)	03/05	06/10
PART - C	Short Answer (SA = 03 Marks) Inorganic Chemistry	03/05	09/15
PART - C	Short Answer (SA = 03 Marks) Physical Chemistry	02/04	06/12
PART- D	Long Answer (LA = 05Marks)	04/06	20/30
PART - E	Short Answer (SA = 03Marks) **Numerical problems**	03/06	09/18
	Total	**35/46**	**70/105**

WEIGHTAGE

Objectives	Number of Questions	Marks	Percentage
Remember	**18**	**40**	**≈ 40%**
Understanding	**12**	**32**	**≈ 30%**
Apply	**07**	**13**	**≈ 10%**
Hots	**09**	**20**	**≈ 20%**
Total	**46**	**105**	**100%**

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SUBJECT: CHEMISTRY (34) BLUE PRINT-3 CLASS: II PUC

Chapter/ Content domain/ Unit/ Theme	Number of hours	Marks	LOTS (≈ 80%)												HOTS (≈ 20%)			
			Remember (≈ 40%)				Understand (≈ 30%)				Apply (≈ 10%)							
			VSA 1M	SA 2M	SA 3M	LA 5M	VSA 1M	SA 2M	SA 3M	LA 5M	VSA 1M	SA 2M	SA 3M	LA 5M	VSA 1M	SA 2M	SA 3M	LA 5M
Physical Chemistry																		
1. Solutions	14	12	1	1					1				1NP				1NP	
2. Electrochemistry	14	13			1				1		1		1NP				1NP	
3. Chemical Kinetics	14	12	1		1		1						1NP		1		1NP	
Inorganic Chemistry																		
4. The d & f - Block Elements	12	10	1	1	1				1		1							
5. Coordination Compounds	12	11	1		2				1						1			
Organic Chemistry																		
6. Haloalkanes and Haloarenes	10	09	1	1						1	1							
7. Alcohols, Phenols and Ethers	12	10	1				1			1					1	1		
8. Aldehydes, Ketones and Carboxylic Acids	14	12				1	1								1			1
9. Amines	08	07				1	1				1							
10. Biomolecules	10	09	1	1			1			1								
Total Teaching Hours & Marks	120	105	7	8	15	10	5	0	12	15	4	0	9		4	2	9	5
Total Questions		46	7	4	5	2	5	0	4	3	4	0	3	0	4	1	3	1

1. Weightage = Total marks/Number of teaching hours = 105/120 = 0.875 (i.e., 0.875marks for each hour)
2. Choice = out of **46** Questions only **35** Questions are to be answered.
3. Note: NP = Numerical Problems; VSA = Very Short Answer (MCQ's and Fill in the Blanks); SA= Short Answer; LA = Long Answer

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Collection Of Question Papers For POCKET MARKS 70/70

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MODEL QUESTION PAPER – 3

Class: II Year PUC | **Academic Year:** 2024-25

Subject: Chemistry (34) | **Maximum Marks:** 70

Time: 3.00 Hours | **No. of Questions:** 46

Instructions

1. Question paper has FIVE parts. All parts are compulsory.
2. a. Part-A carries 20 marks. Each question carries 1 mark.
   b. Part-B carries 06 marks. Each question carries 2 marks.
   c. Part-C carries 15 marks. Each question carries 3 marks.
   d. Part-D carries 20marks. Each question carries 5 marks.
   e. Part-E carries 09 marks. Each question carries 3 marks.
3. In Part-A questions, **first attempted answer** will be considered for awarding marks.
4. Write balanced chemical equations and draw neat labeled diagrams and graphs wherever necessary.
5. Direct answers to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.
6. Use log tables and simple calculator if necessary (use of scientific calculator is not allowed).
7. For a question having circuit diagram/figure/ graph/ diagram, alternate questions are given at the end of question paper in a separate section for visually challenged students.

PART-A

I. Select the correct option from the given choices. **1 × 15 = 15**

1. The concentration term depends on temperature is

   a) ppm b) mole fraction c) molality d) molarity

2. Identify the correct sequence of number of unpaired electrons of the following ions.

   a) $Ti^{+3} > Cr^{3+} > Fe^{3+} > Ni^{2+}$ b) $Fe^{3+} > Ni^{2+} > Ti^{+3} > Cr^{3+}$

   c) $Fe^{3+} > Cr^{3+} > Ni^{2+} > Ti^{+3}$ d) $Fe^{3+} > Cr^{3+} > Ti^{+3} > Ni^{2+}$

3. Four haloalkane compounds represented by the letters M, N, O and P having boiling point are 24.2°C, 38°C, 3.56°C and 101.6°C respectively. Among the four compounds N most likely to be

   a) CH_3Cl b) CH_3Br c) C_2H_5Br d) C_3H_7I

4. Glycine is an optically inactive α-amino acid due to

   a) presence of asymmetric carbon atom b) absence of asymmetric carbon atom

   c) α-carbon attached to 4 different groups d) its acidic nature.

5. **Statement I:** Cu displaces H_2 gas from dilute acids.

   Statement II: Cu^{2+} ions get reduced more easily than H^+ ions

   a) Both Statement I and II are correct

   b) Both Statement I and II are incorrect

   c) Statement I is correct and Statement II is incorrect.

   d) Statement I is incorrect and Statement II is correct.

6. The radioactive substance reduced to $\frac{1}{4}^{th}$ of initial concentration in 20 min, then time taken to reduce to $\frac{1}{16}^{th}$ of the initial concentration is

   a) 60 min b) 120 min c) 40 min d) 15 min

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7. The product/s formed when phenol is treated with excess of bromine water is/are

(i) o-bromophenol (ii) p- bromophenol (iii) picric acid (iv) 2,4,6- tribromophenol

a) only (iii) b) only (iv) c) both (i) and (ii) d) only (ii)

8. Which of the following observation is shown by 2–methylpropan-2-ol with Lucas reagent?

a) Turbidity will be observed after five minutes.

b) No turbidity will be observed at room temperature.

c) Turbidity will be observed immediately.

d) Turbidity will be observed at room temperature but will disappear after five minutes.

9. The transition metal present in red pigment of blood haemoglobin is

a) cobalt b) nickel c) iron d) copper.

10. The geometry of the complex $Fe(CO)_5$ is

a) octahedral b) tetrahedral c) trigonal bipyramidal d) square pyramidal

11. Match the following given in List I with List II

List-I	List-II
A) Gatterman-Koch reaction	i) $SnCl_2$, HCl/ H_3O^+
B) Stephen reaction	ii) CrO_2Cl_2/ H_3O^+
C) Rosenmund reaction	iii) CO, HCl/Anhyd.$AlCl_3$
D) Etard reaction	iv) H_2/ Pd-$BaSO_4$

a) A-(iv), B- (iii), C-(ii), D-(i) b) A-(iii), B-(i), C-(iv), D-(ii)

c) A-(iii), B-(i), C-(ii), D-(iv) d) A-(iii), B-(ii), C-(iv), D-(i)

12. An organic compound with the molecular formula $C_9H_{10}O$ forms 2,4-DNP derivative, reduces Tollens' reagent and undergoes Cannizzaro reaction. On vigorous oxidation, it gives 1,2-benzenedicarboxylic acid. The organic compound is

a) 3-ethyl benzaldehyde b) 2-ethyl benzaldehyde

c) 4-ethyl benzaldehyde d) 2, 3-dimethyl benzaldehyde.

13. The following factor which does not affect the rate of reaction is

a) molecularity b) temperature

c) catalyst d) concentration of reactant

14. The correct order of basic strength in case of ethyl substituted amines in aqueous solution is

a) $(C_2H_5)_2NH > (C_2H_5)_3N > C_2H_5NH_2 > NH_3$

b) $(C_2H_5)_3N > (C_2H_5)_2NH > C_2H_5NH_2 > NH_3$

c) $(C_2H_5)_3N > C_2H_5NH_2 > (C_2H_5)_2NH > NH_3$

d) $NH_3 > (C_2H_5)_2NH > (C_2H_5)_3N > C_2H_5NH_2$

15. N-Ethylbenzenesulponamide soluble in alkali because

a) It does not contain any hydrogen atom attached to nitrogen atom and is not acidic.

b) It contains hydrogen atom attached to nitrogen atom and is strongly acidic.

c) It contains hydrogen atom attached to nitrogen atom but is not acidic.

d) It does not contain any hydrogen atom attached to nitrogen atom but is acidic.

II. Fill in the blanks by choosing the appropriate word from those given in the brackets:

(S_N2, instantaneous, phosphodiester, $CHCl_3$, glycosidic, Yb^{2+},) **5 × 1 = 05**

16. During Surgery, _____ was used as anesthesia

17. The rate at a particular moment of time is expressed as _____ rate of reaction.

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18. The diamagnetic lanthanoid ion is _____.

19. Williamson's synthesis of preparing dimethyl ether involves _____ reaction for the attack of a methoxide ion on methyl chloride.

20. Nucleotides are joined together by _____ linkage between 5′ and 3′ carbon atoms of pentose sugar.

PART–B

III. Answer ANY THREE of the following. Each question carries two marks. 3 × 2 = 06

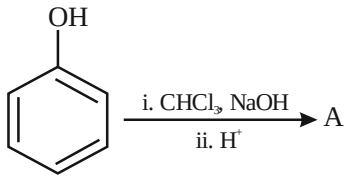
21. Name an important alloy, which contains maximum percentage of the lanthanoid metals. Mention one of its use.

22. Explain Fittig's reaction.

23. Write the expression to relate cryoscopic constant and change in enthalpy of fusion. Explain the terms involved in it.

24. Give an example for female sex hormone and write its function.

25. Complete the following reaction and name the reaction.



PART-C

IV. Answer ANY THREE of the following. Each question carries three marks. 3 × 3 = 09

26. Using abbreviations of following ligands, identify the number of donor sites and write the formula of each ligand. a) en b) EDTA c) PPh_3

27. Write the equations for the preparation of potassium permanganate from pyrolusite ore, what is the colour of $KMnO_4$ crystals?

28. Using Valence Bond Theory [VBT], explain geometry, hybridisation and magnetic property of $[CoF_6]^{3-}$ ion. [Atomic number of Cobalt is 27].

29. Give any three applications of coordination compounds.

30. Transition elements have higher enthalpy of atomization. Give two reasons. Among 3d and 4d series of transition elements, which series has higher enthalpy of atomization?

V. Answer ANY TWO of the following. Each question carries three marks. 2 × 3 = 06

31. What does P and Z_{AB} represent in the equation: $Rate = PZ_{AB}e^{-E_a/RT}$? Name a factor on which Z depends.

32. Name the fuel cell used in Apollo space programme and write its anodic and cathodic reaction.

33. Give any three differences between ideal and non -ideal solutions.

34. Mention any three thermodynamic properties determined by using electrochemical cells.

PART-D

VI. Answer ANY FOUR of the following. Each question carries five marks. 4 × 5 = 20

35. a) Write the reactions involved in the conversion of toluene to m-nitrobenzoic acid.

b) The pK_a values of acetic acid, benzoic acid and trifluoroacetic acid are 4.76, 4.19 and 0.23 respectively. Arrange them in the increasing order of acid strength. Justify the arrangement. (3+2)

36. a) Write the mechanism involved in the conversion of 2-bromo-2-methylpropane to 2-methylpropan-2-ol.

b)What are enantiomers? Name one physical property which differs enantiomers. (3+2)

37. a) Give the mechanism involved in the acid catalyzed hydration of C_2H_4 to C_2H_5OH. (3+2)

b) Name the enzyme involved in fermentation of glucose into ethanol and write its chemical equation.

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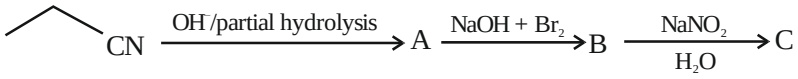
38. a) What does tertiary structure of proteins represent? Give its two major molecular shapes.

b) Write the Haworth structure of α – D – (+)- Glucopyranose. (3+2)

39. a) Identify the product A, B and C.



b) Name any one biologically active amino compound used in the following:

(i) to increase blood pressure (containing secondary amino group)

(ii) as an anaesthetic in dentistry (a synthetic amino compound) (3+2)

40. An organic compound (X) with molecular formula C_8H_8O forms an orange-red precipitate with 2,4-DNP reagent and gives yellow precipitate on heating with iodine in the presence of sodium hydroxide. It neither reduces Tollens reagent nor does it decolourise bromine water. On oxidation with chromic acid, 'X' gives a carboxylic acid (Y) having molecular formula $C_7H_6O_2$. Identify the compounds (X) and (Y) and write all the reactions involved. 5

PART–E

(NUMERICAL PROBLEMS)

VII. Answer ANY THREE of the following. Each question carries three marks. 3 × 3 = 09

41. Calculate the molality of 20%(w/v) aqueous solution of KI. Given density of aqueous solution of KI = $1.2gcm^{-3}$. Molar mass of KI = $166gmol^{-1}$.

42. Vapour pressure of water at 293K is 17.535 mm Hg. Calculate the vapour pressure of water at 293K when 25 g of glucose is dissolved in 450 g of water.

43. Calculate the emf of the following cell and state whether the cell is feasible or not?

Pt (s)| Br^- (0.01M) | Br_2 (l) || H^+(0.03M) | H_2 (g) (1bar) | Pt(s) $E^o(½Br_2|Br^-) = 1.09V$.

44. Calculate the limiting molar conductivity of Cl^- by using the data Λ^o for $CaCl_2$ = 271.6 S cm^2 mol^{-1} and λ^0 for Ca^{2+} = 119.0 S cm^2 mol^{-1}.

45. The rate constant for a reaction is 60 s^{-1}. How much time will it take to reduce the initial concentration of the reactant to its $1/16^{th}$value?

46. In the given reaction A→B, the rate constant k is 2.0 x 10^{-2} lit $mol^{-1}s^{-1}$, find initial rate of reaction when [A] = 0.5 M at 298K.

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