Blue Print for the Physics Question Paper I PUC Physics (33)

Chapter	Topic	Teaching Hours	Marks allotted	1 Mark (MCQ)	1 Mark (FIB)	2 Marks (SA1)	3 Marks (SA2)	5 Marks (LA)	5 Marks (NP)
1	Physical World	2	2			√			
2	Units and Measurement	4	4	√			√		
3	Motion in a Straight Line	8	8	√		√		√	
4	Motion in a Plane	12	11	√		√	√		√
5	Laws of Motion	11	10	√	√		√	√	
6	Work, Energy and Power	11	11	√		√	√	√	
7	System of Particles and Rotational Motion	12	11	√		√	√		√
8	Gravitation	9	9	√	√	√		√	
9	Mechanical Properties of Solids	5	4	√			√		
10	Mechanical Properties of Fluids	5	5	√	√		√		
11	Thermal Properties of Matter	10	10	√√			√		√
12	Thermodynamics	8	8	√		√		√	
13	Kinetic Theory	5	4	√	√	√			
14	Oscillations	8	8	√		√		√	
15	Waves	10	10	√	√		√		√

Instructions:

1. This blueprint must be used for setting question papers for all future examinations.

2. 5 Mark questions from chapters ***Gravitation*** and ***Oscillations*** must be split questions of the form (1 + 2 + 2) or (1 + 1 + 1 + 2) or (2 + 3) or (1 + 1 + 3).

3. 3 Mark Question from the chapter ***Work, Energy and Power*** must be a numerical problem.

DVS PU (Ind) College, Shivamogga
MODEL QUESTION PAPER -2
I PUC - PHYSICS (33)

Time: 3 hours 15 min. **Max Marks:** 70

General Instructions:

1. *All parts are compulsory.*

2. *Part – A questions have to be answered in the first two pages of the answer-booklet. For Part – A questions, first written-answer will be considered for awarding marks.*

3. *Answers without relevant diagram / figure / circuit wherever necessary will not carry any marks.*

4. *Direct answers to the numerical problems without detailed solutions will not carry any marks.*

PART – A

I. Pick the correct option among the four given options for ALL of the following questions: **15 × 1 = 15**

1. The number of significant figures in 40500 X 10^3 is

   A) 2 B) 3 C) 4 D)5

2. Acceleration of particle moving with constant velocity is

   A) Increases with time B) Decreases with time

   C) Zero for all time D) May increase or decrees with time

3. Correct relation between linear and angular velocity is

   A) $V = \omega r$ B) $V = \frac{\omega}{r}$ C) $V = \frac{r}{\omega}$ D) $\omega = \frac{r}{V}$

4. Inertia is a measure of

   A) Momentum B) Force C) Impulse D) Mass

5. 1HP is equal to

   A) 647 W B) 467 W C) 746 W D) 476W

6. Bomb at rest explodes, the center of mass of the fragments

   A) Move along a elliptical path B) Remains at rest

   C) Move along a straight line D) Move along a parabolic path

7. Time period of geostationary satellite is

   A) 1 Day B) 1 week C) 1 month D) 1 year

8. Among steel and rubber

   A) Rubber is more elastic B) Steel is more elastic

   C) Both will have equal elasticity D) None of the above

9. Hydraulic lift works on the principle of

   A) Pascal's law B) Archimedes principle

   C) Bernoulli's principle D) Stokes law

10. The mode of transformation of heat in gases is

    A) Conduction B) Radiation C) Convection D) Both (A) & (C)

11. The radiant energy emitted per second per unit area of a perfect block body is directly proportional to (Where T is the absolute temperature)

A) T^2 B) T^3 C) T^{-2} D) T^4

12. Area under Pressure v/s Volume graph is equal to

A) Temperature B) Work C) Specific heat D) Ratio of specific heat

13. Number of degrees of freedom of diatomic molecule is

A) 5 B) 3 C) 6 D) 7

14. Kinetic energy of a particle executing SHM is maximum at

A) Extreme position B) Intermediate position

C) Mean position D) All of these

15. Identify the longitudinal wave in the following options

A) X-Rays B) Visible light

C) Ultrasonic waves D) Radio waves

II. Fill in the blanks by choosing appropriate answer given in the brackets for ALL the following questions: 5 × 1 = 5

(Less than 90°, Conservation of angular momentum, Elastic, Conservation of linear momentum, 180°)

16. Recoiling of a gun is an illustration of _____ .

17. Kepler's second law is the consequence of _____ .

18. The angle of contact is _____ in the case of liquids which wet the surface of solid.

19. According to assumptions of kinetic theory of gas, molecular collisions are _____ .

20. Progressive wave reflected at a rigid boundary undergoes a phase change of _____ .

PART – B

III. Answer any FIVE of the following questions: 5 × 2 = 10

21. Write any two applications of physics to society.

22. Mention any two differences between distance and displacement.

23. Define scalar product of two vectors. Give one example.

24. Mention any two characteristics of inelastic collision.

25. Mention any two factors on which moment of inertia depends.

26. Write the expression for acceleration due to gravity at a point below the earth surface and explain the terms.

27. What are reversible processes? Give one example.

28. State and explain law of equipartition of energy.

29. Draw the diagram of vibration of air column in open pipe for third mode. And hence express length of the column in terms of wavelength of wave formed.

PART – C

IV. Answer any FIVE of the following questions: 5 × 3 = 15

30. Check the correctness of equation $x = v_0 t + \frac{1}{2} a t^2$ using method of dimension. Where symbols have their usual meaning.

31. Obtain the expression for range of a projectile.

32. Derive the relation $F = ma$, where symbols have their usual meaning.

33. A bullet of mass 50g strikes a wooden plank with a velocity of 200 ms^{-1} and emerge out with a velocity of 50 ms^{-1}. Calculate the work done by the bullet against the resistive force offered by the plank.

34. Derive an expression for moment of inertia of a disc about its diameter by using perpendicular axis theorem.

35. Define three types of elastic modulie.

36. Deduce the expression for pressure inside the liquid.

37. State and explain law of thermal conductivity.

38. Explain Laplace correction to Newton's formula.

PART – D

V. Answer any THREE of the following questions: **3 × 5 = 15**

39. Define acceleration. Deduce $v^2 = {v_0}^2 + 2ax$ using v-t graph.

40. Obtain the expression for maximum safe speed on a banked road.

41. State and prove law of conservation of mechanical energy in the case of freely falling body.

42. i) Define orbital speed. (1)

    ii) Derive the expression for orbital speed of earth satellite. (3)

    iii) Mention the relation between orbital speed and escape speed. (1)

43. Obtain the expression work done in adiabatic process.

44. i) What is phase of oscillating particle? (1)

    ii) Give the graphical representation of displacement with time for SHM. (1)

    iii) Derive an expression for velocity of a particle executing SHM. (3)

VI. Answer any TWO of the following questions: **2 × 5 = 10**

45. A stone tied to the end of string 1m long is whirled in a horizontal circle with a constant speed. If the stone makes 150 revolution in 25 seconds. What is the magnitude and direction of acceleration of the stone?

46. A rope of negligible mass is wound round a hollow cylinder of mass 3kg and radius 40cm. What is the angular acceleration of the cylinder if the rope is pulled with a force of 30N? What is the linear acceleration of the rope? Assume that there is no slipping.

47. Calculate the rate of flow of heat through a glass window 2.0 m X 1.5 m area and 3.2 mm thick. If the temperature of inner and outer surfaces are 15°C and 14°C respectively (K for glass = 0.84 $Wm^{-1}K^{-1}$).

48. Two cars are moving with speeds of 54 $kmhr^{-1}$ & 18 $kmhr^{-1}$ in opposite direction along a straight road. The faster car sounds the horn with a note of frequency of 240 Hz. Calculate the number of waves received per second by a listener sitting in the other car when it (i) approaches (ii) recedes from the listener if the speed of the sound in air is 340 ms^{-1}.