II PU PHYSICS PRACTICAL VIVA-VOCE

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CONTENTS

Experiments

Sl. NO

PHYSICS PRACTICAL EXAMINATION

General Instructions:

- Duration of practical examination:2 hours
- Maximum marks allotted: 30 marks

A. Weightage of marks

SL NO	Particulars	Marks
1	Performing the experiment	20
2	Viva-voce	04
3	Practical Record	06
	Total	30

B. Distribution of marks for performing the Experiment

SL NO	Particulars	Marks
1	Writing the principle of the experiment	2
2	Writing the formula and explaining the terms with unit.	2
3	Writing the diagram/figure/circuit with labelling (At least two parts) With nature of the graph	2
4	Writing the observation pattern / tabular column	2
5	Constructing the experimental set up/circuit	3
6	Performing the experiment and entering the readings into the tabular column/observation pattern	4
7	Substitution and calculation/plotting the graph and calculation	3
8	Result with unit	2
Total		20

C. Viva-voce

1. Four questions must be asked and each question carries 1 marks.
2. The questions in the viva-voce should be simple, direct and related in lie experiment to be performed by the student.

EXPT-1

RESISTANCE PER UNIT LENGTH OF THE WIRE

1. **Define electric current?**
   The rate of flow of electric charge with time is called current.

2. **What is SI unit of electric current?**
   The SI unit of electric current is ampere.

3. **What is meant by the term electric potential difference?**
   The electric potential difference between two point in an electric field is defined as the work done to move one coulomb positive charge form one point to the other.

4. **What is a conductor?**
   It is a substance which allows the flow of the electric charge thorough itself e.g. Copper , Silver etc.

5. **Give example of a good non- metallic conductor.**
   Graphite

6. **State Ohm's law**
   At constant temperature, current following through a conductor is directly proportional to the potential difference across its ends, provided other physical conditions remain constant.

7. **Define one Ohm**
   The resistance of a conductor is said to be one Ohm, when a potential difference of $1\ V$ applied across its ends produces a current of $1\ A$ in it.

8. **Define One Volt.**
   The electric potential at a point is said to be 1 V, If one joule of work is done in moving one coulomb of a charge from infinity to that point against the electric feild.

9. **Define 1 ampere.**
   If the rate of flow charge is 1 coulomb then current is said to be 1 ampare.

10. **What is resistance of a conductor?**
    It is the effective opposition offered by a conductor to the flow of current through it.

11. **What is the S.I unit of resistance?**
    The S.I unit of resistance is ohm (Ω).

12. **How ammeter connected in a circuit?**
    series

13. **How voltmeter connected in a circuit?**
    Parallel.

14. **State the factors and which the resistance of a conductor depends.**
    The resistance of conductor depends on
    (i) its length (ii) area of cross-section
    (iii) nature of the material of the conductor.

15. **Name an element which in different allotropic forms acts as a good conductor and a good insulator.**
    Carbon (Conductor as graphite and insulator as diamond).

16. **What is an ohmic resistance?**
    The resistance which obeys Ohm's law is called ohmic resistance.

17. **What is the shape of V v/s I graph for an ohmic conductor?**
    The graph is a straight line. So the ohmic conductor is also called a linear device.

18. **What is a non- linear device? Give an example.**
    A device is said to b non- linear if v v/s I graph for it is a curve e.g. pn junction.
    Ex: semiconductor

19. **How is the resistance of conductor affected by rise in the temperature?**
    The resistance increases

20. **Give example of a material whose resistance decreases with rise in temperature.**
    semiconductor

21. **How the resistance of the conductor varies with the area of cross section?**
    Resistance varies inversely with the area of cross-section.

22. **How cross section of the conductor depends on the resistance.**
    It is the $R \propto \frac{1}{A}$

23. **Is rheostat a resistor?**
    Yes. It is a variable resistor.

24. **Slope of V-I graph gives which physical quantity?**
    The slope of V-I graph measures resistance.

25. **Why large amount of current is not preferred in this experiment?**
    When large current passes, the conductor gets heated more and hence its resistance changes.

26. **What is an ohmic conductor?**
    Conductor which obeys Ohm's law is called ohmic conductor.

27. On what factors does resistance of a conductor depend?
Length of the conductor, Area of cross section, type of semiconductor and temperature.

28. Length of a material halved. What happens to its resistance?
Resistance will be halved.

29. Thick metal plates used in a metre bridge for connections. Why?
Thick metal plates have large area of cross section and hence less resistance. Hence parts of the instruments do not add to any resistance.

Expt-2

RESISTIVITY OF THE MATERIAL OF THE WIRE

1. What is the principle of metrebridge?
It is based on the principle of balanced Wheatstone's network.

2. What is null point?
It is a point on the wire, where the galvanometer shows zero deflection.

3. Under balanced condition of Metre Bridge, if the resistance of the galvanometer is doubled, what is the change in the balancing length?
There is no change in the balancing length.

4. What is the potential difference across the galvanometer at null point?
At null point potential difference across the galvanometer is zero.

5. How do you verify the proper connection in meter bridge experiment?
If the deflection in the galvanometer is opposite, when the slider is placed at two extreme ends of the metre bridge wire, then the connation is proper.

6. What is resistivity Or specific resistance?
It is the resistance of a given wire of unit length and unit area of cross section.

7. On what factors does resistivity of a material depend?
Resistivity depends on the material and temperature.

8. Does resistivity depend on length and area of cross-section of the material?
No.

9. Length of a conductor is doubled. What will be its new resistivity?
Resistivity remains same.

10. Why is metre bridge preferred to measure the resistance?
It employs null method to measure resistance. Hence no error occurs in the measurement of resistance.

11. Balancing length as measured from left side in a meter bridge is more than $50cm$. If R and S are resistance in left and right gaps respectively then which resistance is greater?
R > S.

12. The known resistance in the right gap of metre bridge is kept zero ohm. What will be the balancing length?
Galvanometer will not show zero deflection.

13. Resistance in the right gap of metre bridge is increased. What happens to the balancing length?
Balancing length decreases.

14. In a metre bridge circuit, galvanometer is showing deflection in one side only. What may be wrong in the circuit?
(i) Resistance in the right gap may not unplugged (zero ohms)
(ii) left gap (where unknown resistance is connected) may be short.

15. Why we can't flow continuously current in circuit while taking reading?
Heat is produced and resistance increases.

16. Why the wire of metre bridge should have same crass sectional area?
Resistance inversely proportional to crass sectional area and R α lenght.

17. Can we use copper wire in meter bridge experiment?
No, we can't use it.
It produces more heat.

18. Why a metre bridge wire is a constantan or manganin.?
Low temperature coefficient .

19. What is low temperature coefficient ?
Its temperature varies resistance remains constant .

20. Can we measure very low or very high resistance from meter bridge .
No

21. Is it necessary to keep the length of the wire 1 meter in the experiment ?
No.

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22. Why should area of cross section of the wire be uniform?
If wire is uniform then the resistance per unit length will be uniform.

23. Thick metal plates used in a metre bridge for connections. Why?
Thick metal plates have large area of cross section and hence less resistance. Hence parts of the instruments do not add to any resistance.

Expt-3

COMBINATION OF RESISTANCES

1. What is Metre Bridge?
It is a modified form of *Wheatstone's* network

2. What is the effective resistance?
Effective resistance is the total resistance of the circuit.
Effective resistance is usually measured between two points.
potential drop $\propto$ lenght.

3. What is the effect resistance of two equal resistance connected in series?
It is the sum of their individual resistance.

4. What is the effective resistance of two equal resistance connected in parallel?
It is the sum of the reciprocals of their individual resistance.

5. What is the need of combination of resistance?
To get the desired range of resistance required for electrical circuit.

6. Why metal strips are made thick in Metre Bridge?
The thick metal strips have negligible resistance.

7. Why the jockey should be pressed too hard on the wire when sliding over it
It alters the area of cross section of the wire, which in turn changes the resistance per unit length of the wire.

7. What is a metre bridge? Why is it used?
Metre bridge is device used to measure unknown resistance working on the principle balanced *wheatstone's* bridge.

8. Which combination of resistors gives maximum value of resistance?
Series.

9. Which combination of resistors gives minimum value of resistance?
Parallel.

10. When do you say that resistance are in parallel?
When potential difference across them is same.

11. The resistance coils in a resistance box are doubly wound why?
The winding makes the resistance coil non-inductive.

12. What material is used to make standard resistances?
Constantan and Manganin.

13. Why constantan and manganin are used to make standard resistance?
These materials have high resistivity and low temperature coefficient of resistance.

14. When do you say that two resistors are in series?
When current through them in same.

15. Two resistors are in series. What is common in them? Current or voltage?
Current.

16. Two resistors are in parallel. What is common in them? Current or voltage?
Voltage.

17. Balancing point is at the midpoint of metere bridge wire. What does it imply?
Resistance values at both the gaps of metre bridge are same.

Expt-4

COMPARISION OF THE EMF's OF TWO CELLS

1. What is a potentiometer?
It is an instrument used to measure potential difference of emf of a cell accurately.

2. What is the principle of a potentiometer?
It works on the principle that for a constant current, fall of potential along a uniform wire is directly proportional to its length.

3. What is Electromotive force (emf) of a cell?
Emf of a cell is the potential difference across the terminals of the cell when the cell is an open circuit i.e., when no current is drawn from the cell.

4. What do you mean by sensitivity of a potentiometer?
Sensitivity of a potentiometer is the smallest potential difference that it can measure.

5. Under what conditions deflection in the galvanometer is shaky?
The reasons may be,
a) The emf of the battery or the cells may be fluctuating

b) The circuit has a loose contact somewhere

6. **Why should we use a sensitive galvanometer?**
A sensitive galvanometer will respond to even a small departure from the exact balance point and will hence enable us to locate the balance point with greater precision.

7. **What do you mean by potential gradient?**
the potential gradient means the potential difference per unit length of the potentiometer wire.
S.I unit of potential gradient is Vm^{-1}.

8. **What do you mean by e.m.f of a cell?**
It is the maximum potential difference across the terminals of a cell in an open circuit.

9. **What do you mean by terminal voltage?**
It is the potential difference across the terminals of a cell when current is being draw form it.

10. **What is a primary cell?**
It is a cell which cannot be recharged.

11. **Under what conditions deflection in the galvanometer is shaky?**
The reasons may be,
a) The emf of the battery or the cells may be fluctuating
b) The circuit has a loose contact somewhere

EXPT-5

FIGURE OF MERIT OF GALVANOMETER

1. **What is a galvanometer?**
It is a device used for detecting feeble (very small) electric current in circuits.

2. **Do you have positive and negative terminal in the galvanometer?**
No, the galvanometer has no positive and negative terminal. The pointer can deflect on either side of zero in the middle.

3. **Which part of the galvanometer offers resistance?**
The coil of the galvanometer offers resistance.

4. **What is the meaning of figure of merit of galvanometer.**
Figure of merit of a galvanometer is the current required to produce a deflection of one division on the galvanometer scale.

5. **Define current sensitivity of a galvanometer.**
The deflection produced per unit current (1A) is called current sensitivity.

6. **What is the SI unit of figure of merit?**
The SI unit of figure of merit is ampere per division.

7. **On what factors does the figure of merit of a galvanometer depend?**
Number of turns in the galvanometer coil, area of coil, strength of magnetic field.

8. **How does the galvanometer resistance 'G' vary as the current through the galvanometer increases?**
G does not vary the current.

9. **What happens if the experiment is performed without high resistance R?**
High current will be passed through the galvanometer and damage it.

10. **Is galvanometer resistance a constant?**
Yes.

11. **Resistance S required to produce half deflection is taken as galvanometer resistance G. Why?**
Let S be open. Now current passes only through G and produces a deflectionθ. When we unplug S such that G=S, current flowing through galvanometer earlier, now reduces the half and reaming half flows through S. Deflection in G reduces to $\theta/2$.

12. **What is the principle of galvanometer?**
It works on the principle that a current carrying coil placed in a uniform magnetic field experiences a torque

13. **Should galvanometer have a low or a high resistance?**
A galvanometer should have a low resistance.

14. **A galvanometer is called the basic electrical measuring instrument. Why?**
It is so called because it is modified to measure current and voltage.

EXPT-6

CONVERSION OF GALVANOMETER IN TO AMMETER AND VOLTMETER

1. **How do you convert the given galvanometer into an ammeter?**
A galvanometer can be converted into an ammeter by connecting a low resistance in parallel with the galvanometer.

2. **How do you convert the given galvanometer into voltmeter?**
A galvanometer can be converted into a voltmeter by connecting high resistance in series with the galvanometer.

3. **On what factors the value of shunt resistance depends?**
It depends on the range of the required ammeter and resistance of the galvanometer.

4. **On what factors the value high resistance connected in series depends?**
It depends on the range of the required voltmeter and resistance of the galvanometer.

5. **What is the resistance of an ideal ammeter/voltmeter.?**
Ideal ammeter has zero resistance.
Ideal voltmeter has infinite resistance.

6. **What is the current flowing through the shunt?**
The current flowing through shunt is, $(I - I_g)$.

7. **What is an ammeter?**
Instrument used to measure current.

8. **What is a voltmeter?**
Instrument used to measure potential difference.

9. **How do you connect a voltmeter in a circuit?**
In series.

10. **How do you connect a voltmeter in a circuit?**
In parallel.

11. **Can you convert a voltmeter into an ammeter and vice versa? How?**
Yes.
To convert a voltmeter into an ammeter connected a very low resistance in parallel with the voltmeter.
To convert a ammeter into an voltmeter connected a very high resistance in series with the ammeter.

12. **A galvanometer is converted into a voltmeter of range 'V' volts. If the range has to be increased how should series resistance be varied?**
Increase the series resistance.

13. **A galvanometer is converted into an ammeter of range 'I' amperes. If the range has to be increased how should the shunt resistance be varied?**
Decrease the shunt resistance.

14. **What is voltmeter?**
It is on instrument used to measure the potential difference between two points.

15. **How is an ammeter connected in a circuit?**
An ammeter is always connected in series

16. **What should be the resistance of the voltmeter ?**
It should be I.

17. **Is voltmeter also convertible into an ammeter?**
Yes. By shunting the voltmeter with a low resistance parallel

18. **How can you can you change a voltmeter in to millivoltmeter?**
Decreasing its resistance because this resistanceof voltmeter is much less than that of voltmeter.

19. **Can you change on ammeter into voltmeter?**
Yes. By putting suitable high resistance in series with ammeter.

EXPT-7

FREQUENCY OF AC USING OF SONOMETER

1. **What are different types of electric current?**
Direct current and alternating current.

2. **What is meant by frequency of AC.**
It is the number of cycles completed by AC in one second.
or
it is the current which reverses its direction of flow after regular intervals of time .

3. **What is meant by direct current?**
The current which continuously flows in same direction is called direct current.

4. **What are resonant vibrations?**
The forced vibrations are said to be resonant vibrations if the natural vibration frequencies of the driver and the driven bodies match.

5. **What is meant by frequency of DC?**
Direct current which as one direction, steady current is the current whose magnitude and direction does change with time.

6. **How does AC differ from DC?**
DC has same (constant) magnitude and same direction. While AC has a changing magnitude and changing direction.
DC repels but AC attracts.

7. **Define root mean square(rms) Or virtual Or effective value of AC?**
It is that value of steady current which, when passed through a given resister for certain time(Time of one complete cycle) shall produce the same quantity of

heat as the given alternating current shall produce when passed through the same resister for same time.

8. Give an expression for rms value of AC?

$I_{rms} = \frac{I_0}{\sqrt{2}} = 0.707\ I_0$.

9. What is the principle of this experiment OR How is frequency of magnetization of the electromagnet related with frequency of the alternating current?

It is the twice of the frequency of the alternating current.

10. What is fluctuating current?

A current changing magnitude and same direction is called fluctuating current.

11. Which parameter changes when the distance between the Knife edges is varied.

The natural frequency of the sonometer wire changes, when the distance between the knife edges is varied.

12. What type of waves are produced in the wire of sonometer?

Transverse stationary waves are produced in the wire of a sonometer.

13. What are stationary waves?

When two identical waves of same frequency, same amplitude travelling in a medium with same speed but in opposite direction superpose, they produces stationary waves.

14. What are Nodes and anti nodes?

Nodes are the point of zero amplitude and Antinodes are points of maximum amplitudes.

15. What is the value of frequency of DC?

The frequency of DC is zero.
The frequency of AC is 50 Hz.

16. If the diameter of the sonometer wire is increased, how does the resonating length change?

ON increasing the diameter of the sonometer wire, the resonating length decreases.

17. How does the resonating length of the wire vary with the tension in the string?

Resonating length increases with the tension in the wire.

18. What is sonometer?

A sonometer, is also called a monochord, was invented by Pythagarous (580-500 B.c). It is simple instrument used to verify the laws of stretched strings & to determine the frequency of a tuning fork.

OR

Sono means sound.It is an instrument to determine the frequency of sound ($vibration$ of a string).

19. Which material is used to make sonometer wire?

Iron, it is a ferro magnetic material.

20. What do you mean by A.C?

Current which varies sinusoidal with time.

21. What is the frequency of a ac supplied by $KPTCl$?

$50HZ$ (IN INDIA).

22. What is resonance?

When the frequency of applied force and natural frequency of a system are same, the condition is called resonance.

OR

When the natural frequency of the resonating wire is equal to frequency of applied force, wire vibrates with maximum amplitude. Now the condition is called resonance.

23. What is unidirectional current?

A current having magnitude changing between maximum and zero and same direction is called unidirectional current.

24. What is electromagnet?

When a wire is wound on a ferromagnetic material and current is passed through it, the material turns into a magnet. The magnet is called electromagnet.

25. Using this experiment can you measure the frequency of D.C? If yes, how? If no why?

No. Frequency of dc is zero. Hence sonometer wire does not vibrate.

26. How does resonating length vary with tension, T?

Resonating length is directly proportional to square root of tension.

27. Give the merits of AC?

- ❖ AC can be produced and transmitted and cheaply than DC
- ❖ AC can be easily converted into DC.
- ❖ AC voltage can be transmitted to any desired value with the help of a transformer.

28. Give the de-merits of AC over DC?

- AC attracts a performs who touches it's the whereas DC.Gives a repelling shock.
- Commercial generally do not produce pure AC.
- The AC gives a hugs & sudden shock, which becomes rated.
- AC is conducted over the surface of a conductor. It increases effective resistance of the conductor

29. Define wave length for a stationary wave?

The distance between the centre of successive crests and troughs.

30. When will the wire resonate?
When the frequency of AC main is equal to the natural frequency of the vibration of the wire.

31. Why is the sonometer box provided with holes?
The holes help maintain free contact of air in the box with atmosphere.

32. What is the role of step down transformer?
It decreases a.c. voltage.

33. Does a transformer operate on d.c.?
NO .

34. What will happens if d.c. is passed through the wire?
The wire will not vibrate.

35. Why do we use non- magnetic wire?
So that there is no magneit interaction between the magnetite wire and the magnet. The only force should be due to the magnetic field of the current.

36. Does the transformer affect the frequency of a.c.?
No .

37. Define frequency.
It is defined as the number of cycles completed per sec.

38. What is S.I unit of frequency?
hertz.

39. What is time period? How is it releated to frequency?
The time token by a particle to complete one full vibration is called time period.
Frequency is reciprocal of the time period.

40. What is the value of frequency of DC?
The frequency of DC is zero.
The frequency of AC is 50 Hz.

41. What is sound ?
It is a form of energy which produces sensation of hearing in us.

42. What is the audible frequency range of normal human ear?
20 Hz to 20000 Hz.

43. What is wave motion?
the motion of disturbance through a medium is called wave motion.

44. What are different types of wave motion ?
Transverse wave and longitudinal wave.

EXPT-8

FOCAL LENGTH OF CONCAVE MIRROR

1. When does a concave mirror produce virtual image?
When the object is placed between the principle focus and pole of a concave mirror, image formed is virtual.

2. What is focal length of a concave mirror?
It is the distance between the pole and the principle focus of a concave mirror.

3. What is radius of curvature?
It is the radius of the sphere of which the spherical mirror forms a part.

4. What is the value of radius curvature of plane mirror?
Infinity.

5. How is the light nature?
Light show dual nature.

6. Law of reflection?
States that the incident ray, the reflected ray and the normal to the surface of the mirror all lie in the same plane.
Angle of incidence equal to angle of reflection.

7. If we object on centre of curvature in concave mirror, then which type of image is formed?
Real and invited image.

8. What is the relation between focal length and radius of curvature of spherical mirror?
The relation between focal length and radius of curvature is $f = \frac{R}{2}$.

9. What is the nature of the image formed by a concave mirror when an object is kept between F and 2F?
The nature of the image formed by a concave mirror when an object is kept between F and 2F is real and inverted.

10. How do you distinguish between convex and concave mirror without touching?
If the image formed by the mirror is small in size, virtual and erect for all possible positions of the object then it is a convex mirror, otherwise it is a concave mirror.

7. What difference will you find in the virtual image formed by concave and convex mirrors?

In a concave mirror, virtual image is always enlarged. In a convex mirror, virtual image is always diminished.

8. **Can a concave mirror form same sized real image? If yes, when? If no, why?**
Yes. When the object is at the centre of curvature.

9. **Name one common use of a concave mirror.**
As a reflector in vehicle head lights. (As a shaving mirror, dentists use concave mirror to get enlarged virtual image of the teeth).

10. **Which type of mirror is used by dentists? Why?**
Concave mirror. Because concave mirror forms virtual enlarged image when teeth lies within the focus.

11. **A mirror like reflector is placed behind the bulb inside the head light of vehicles. Which type of mirror is it?**
Concave mirror.

12. **In a concave mirror object distance is decreased. What happens to the image distance?**
Increases.

EXPT-9

FOCAL LENGTH OF CONVEX LENS

1. **What is light?**
Light is a form of energy from which we can see the object around us.

2. **What is a lens?**
A lens is an optical medium bounded by two surfaces of which at least one is spherical.

3. **What is principle focus OR focal point**?
The point on the axis of a lens OR mirror to which parallel rays of light converge OR from which they appear to diverge after refraction OR reflection.

4. **What is principle axis?**
The line passing through the optical centre and centre of curvature of the focus of a lens or a curved mirror called principle axis.

5. **What is focal length?**
It is the distance from the centre of the lens to its principle focus.

6. **What is object distance?**
It is the distance from centre of lens to the object.

7. **What is image distance?**
It is the distance from centre of lens to the image.

8. **When is the image real, enlarged and inverted in a convex lens?**
When the object is between f and 2f the image is real, enlarged and inverted.

9. **Can a convex lens be used as a magnifier?**
Yes, for u < f the image is virtual, erect and enlarged, hence it can be used as a magnifier.

10. **How many types of lenses?**
Two types a) Convex lens
b) Concave lens

11. **How radiuses of curvature are present in convex lens?**
Two radius of curvature.

12. **How many focal points are present in convex lens?**
Two

13. **In which quantities the focal distance depend?**
Material of the lens, medium, and frequency of light.

14. **What is the focal point, refractive index and radius of curvature of the lens?**
$\frac{1}{f} = (n-1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$.

15. **What is the lens formula?**
$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$.

16. **What is the mirror formula**?
$\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$.

17. **In which situation convex lens behave like concave lens?**
When convex lens placed in transparent medium then.

18. **Does focal length of a convex lens depends on its thickness.**
Yes, thick lens has small focal length and a thin lens has large focal length.

19. **Is convex lens a diverging or a converging lens?**
A convex lens is a converging lens.

20. **Define principle focus of a convex lens?**
It is a point on the axis, such that rays starting from this point, after refraction through the lens, becomes parallel to the principle axis.

15. **What do you mean by focal point of a lens?**
Paraxial rays incident on a lens, after reflection meet at point. This point is called focal point.

16. **Lens made of glass is diverging parallel rays of light in air. What type of lens it is?**
Concave lens.

17. **Name one common use of concvax lens.**
Convex lens is used as a simple microscope. (Reading lens)

18. **What position of the object will a convex lens produce virtual image?**
Object within the focus.

19. **What is the value of radius of curvature of plane mirror?**
Infinity

EXPT-10

FOCAL LENGTH OF CONVEX MIRROR

1. **What type of image is formed by a convex mirror?**
A convex mirror forms a virtual, erect and diminished image.

2. **Mention any one use of convex mirror.**
It can be used as rear view mirror in vehicles.

3. **Why convex lens is used in finding the focal length of a convex mirror?**
Light reflected from convex mirror is diverting, to have a real image we use a convex lens.

4. **Why the object must be placed between 1 and 2f of a convex lens?**
To have a real, inverted and enlarged-image, the object must be placed between f and 2f of a convex lens.

5. **What is the relation between focal length and radius of curvature?**
The relation between focal length and radius of curvature is R=2f.

6. **What is the principle used to find the focal length of convex mirror?**
Any ray of light incident normal to the convex surface appears to come from the centre of curvature.

7. **What is focal length of a mirror?**
Paraxial rays incident on a mirror after reflection meet at a point. Distance of this point from the pole of the mirror is called foal length.

8. **Can a convex mirror form same sized virtual image?**
No (It always forms diminished virtual image)

9. **Name one common use of a convex mirror.**
As a rear view in vehicles.

10. **Which type of mirror is used as rear view of vehicles? Why?**
Convex mirror. Because it always forms virtual image (image inside the mirror) irrespective of the position of the object in front of the mirror.

11. **Why do we use convex lens to find the focal length of convex lens?**
Convex lens is used to obtain converging rays. When converging rays are incident on convex mirror, it forms real image whose distance can be measured.

EXPT-11

FOCAL LENGTH OF A CONCAVE LENS

1. **What is concave lens?**
Lens which diverge the parallel beam of light incident on it is called concave lens.

2. **What is the nature of image produced by the concave lens?**
Concave lens always produce a virtual, erect and diminished image.

3. **Which type of lens is required to find the focal length of concave lens by parallax method?**
Convex lens.

4. **Why image position changes when concave lens is introduced between convex lens and image?**
Since concave lens is diverging, image position changes.

5. **For which type of eye defect, concave lens is used?**
For short sightedness or myopia.

6. **What is the value of magnification in case of concave lens?**
It is always less than one and negative, m<1.

7. **What is focal length of a lens?**
Paraxial rays incident on a lens, after refraction meet at point. Distance of this point from the optic centre of a lens is called focal length.

8. **A man is wearing concave lens are spectacle. What type of eye effect has he?**
Myopia.

9. **What type of image is commonly formed by a concave lens?**
Virtual, diminished, erect image.

10. **For which position of object will a concave lens produce virtual image?**
For all, positions of object.

11. What can we do to decrease the diverging effect of concave lens?
Increase the radius of curvature of each surface.
(Means we are increasing the focal length, decreasing the power).

12. Why do we use convex lens to find the focal length of concave lens?
Convex lens is used to obtain converging rays. When converging rays are incident on concave lens, it forms a real image.

EXPT-12

REFRACTIVE INDEX OF WATER

1. Define refractive index of a medium?
The ratio of the velocity of light in vacuum to the velocity of light in a medium is called refractive index of the medium.

2. What is convex lens?
A lens which converge parallel beam of light passing through it is called converging lens or convex lens.

3. What is refraction?
The change in direction of a ray of light when it travels from one medium to another is called refraction.

4. State Snell's law.
The ratio of the sine of the angle of incidence to the since of angle of refraction is a constant for a given pair of media and for a given colour of light.

5. What is radius of curvature?
The radius of the sphere of which the mirror or lens is a part is called radius of curvature.

6. Which property of light ray does not change in refraction?
Frequency of light ray remains the same during refraction.

EXPT-13

SEMICONDUCTOR DIODE

1. What is a semiconductor diode?
Semiconductor diode is a two terminal pn junction device.

2. Mention the types of semiconductors.
Intrinsic (pure) semi conductors.
Extrinsic (impure) semi conductors.

3. What is extrinsic semiconductor?
Extrinsic semiconductor is one that has been doped ; during manufacture of semiconducting systems

4. Mention the types of Extrinsic semiconductors
n Type semiconductors
p type semiconductors

5. How do you forward bias silicon junction diode?
Junction diode is forwarded biased by connecting p region positive and n region to negative terminal of the battery.

6. What do you mean by junction potential difference in a pn junction diode?
It is the potential difference across the junction of the semiconductor diode when it is unbiased.

7. What is Knee voltage?
It is the voltage at which the current raises sharply in forward biased condition.

8. How do you reverse bias the junction diode?
Junction diode is reverse biased by connecting n region to positive and p region to negative terminal of the battery.

9. What is break down voltage?
It is the very high voltage at which the current raises sharply in reverse biased condition.

10. What is depletion region or junction region of semi conducting diode?
It is a region in a P-N junction diode where no mobile charge carriers are present.
OR
It is the region where flow of charge carriers or decreased over a given time and finally empty mobile charge carriers or full of immobile charges.

11. What do you mean by biasing a diode?
Supplying energy to the junction is called biasing. The equilibrium barrier potential of a p-n junction diode can be altered by applying on external voltage across the diode this is called biasing.

12. Name one application of diode (semiconductor).
Rectifier.

13. What is the difference between semiconductor diode and a resistor?
A resistor offers same resistance when current flows through it in both the directions. But a diode offers low resistance when current flows in one direction and very high resistance when current flows in opposite direction.

14. What do you mean by cut-in voltage?
The forward voltage of the diode after which current increases sharply is called knew voltage.

15. What is the reverse saturation current?

For a diode in reverse bias, the current is very small and a reverse current remains almost constant with change in bias. This reverse current of diode is called reverse saturation current.

16. What happens to the junction resistance of a diode when it is forward biased?
Decreases.

17. What happens to the junction resistance of a diode when it is reverse biased?
Increases.

18. What are the resistance of the diode during forward and reverse bias?
Resistance of a diode in forward bias is less and reverse bias is high.

19. How do you identify the P-side and N-side of a semiconductor diode?
(i) A white ring marked on the diode represents then n-region of the diode.
(ii) OR by checking the resistance of the diode.
Resistance of the diode in forward bias is less and in reverse bias is high.

EXPT-14

ZENER DIODE

1. What is a zener diode?
Zener diode is a heavily doped junction diode, generally used in reverse biased condition.

2. How do you reverse bias the Zener diode?
Zener diode is reverse biased by connecting n region to positive and p region to negative terminal of the battery.

3. What is meant by zener break down?
It is the voltage at which the current raises sharply in reverse biased condition.

4. Which is the main application of Zener diode?
Zener diode is mainly used as a voltage regulator.

5. What is the use of rheostat in this experiment?
To vary the reverse bias voltage across the zener diode, rheostat is used.

6. Can the zener diode be used in forward biased condition?
Yes, it can be.

7. Name on common use of Zener diode?
As a voltage regulator.

8. What do you mean by Zener break down.
It is the condition in the reverse biased zener diode where no change in zener voltage occurs for any change in current.

9. What do you mean by avalanche breakdown?
A process that occurs in a diode when high voltage causes free electrons to travel at high speeds, colliding with other electrons and knocking them out of their orbits. The result is a rapidly increasing amount of free electrons.

10. How is zener diode different from ordinary semiconductor diodes?
Zener diode is doped more heavily than ordinary diode. Ordinary diodes are not used in breakdown region whereas zener diode is used in break down region.

11. What are majority in a p-region?
Majority-holes.
Minority-electrons.

12. What are majority in a n-region?
Majority-electrons
Minority-holes.