Physics CBSE XII

Mock Paper 1 (2026)

Time Allowed: 3 hours **Maximum Marks: 70**

General Instructions:

1. There are 33 questions in all. All questions are compulsory.
2. This question paper has five sections: Section A, Section B, Section C, Section D and Section E.
3. All the sections are compulsory.
4. **Section A** contains sixteen questions, twelve MCQ and four Assertion Reasoning based of 1 mark each, **Section B** contains five questions of two marks each, **Section C** contains seven questions of three marks each, **Section D** contains two case study based questions of four marks each and **Section E** contains three long answer questions of five marks each.
5. There is no overall choice. However, an internal choice has been provided in one question in Section B, one question in Section C, one question in each CBQ in Section D and all three questions in Section E. You have to attempt only one of the choices in such questions.
6. Use of calculators is not allowed.

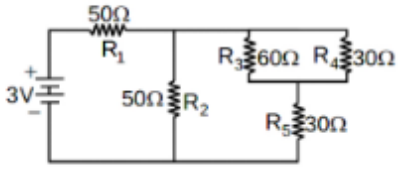
Section A

1. At which temperature, a pure semiconductor behaves slightly as a conductor? **[1]**

   a) room temp. b) both low and room temp.

   c) high temp. d) low temp.

2. In circuit shown below, the resistance are given in ohms and the battery is assumed ideal with emf equal to 3 volt. The voltage across the resistance R_4 is: **[1]**



   a) 1.2 V b) 0.6 V

   c) 0.4 V d) 1.5 V

3. Reflecting telescope utilizes **[1]**

   a) Prism b) Convex mirror

   c) Both Convex mirror and Concave mirror d) Concave mirror

4. A magnet is cut in three equal parts by cutting it perpendicular to its length. The time period of original magnet is T0 in a uniform magnetic field B. Then, the time period of each part in the same magnetic field is **[1]**

a) None of these

b) $\frac{T_o}{2}$

c) $\frac{T_o}{3}$

d) $\frac{T_o}{4}$

5. Capacitance of a conductor is $1\mu\ F$. What charge is required to raise its potential to 100 V? **[1]**

a) $200\mu C$

b) $50\mu C$

c) $100\mu C$

d) $150\mu C$

6. The magnetic force on a point charge is $\vec{F} = q(\vec{v} \times \vec{B})$, The dimensions of $\vec{B}$are: **[1]**

(Here q = electric charge, $\vec{v}$ = velocity of point charge, $\vec{B}$ = magnetic field)

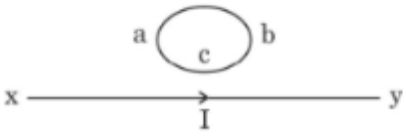
a) $[MT^{-2}\ A^{-1}]$

b) $[MLT^{-1}A]$

c) $[M^1L^2T^{-1}A^{-2}]$

d) $[M^2LT^{-2}A^{-1}]$

7. The direction of induced current in the loop abc is: **[1]**



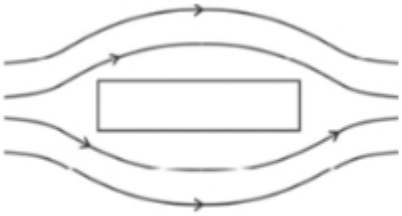
a) along abc if I increases

b) along acb if I increases

c) along abc if I is constant

d) along abc if I decreases

8. The magnetic field lines near a substance are as shown in the figure. The substance is: **[1]**



a) Copper

b) Sodium

c) Iron

d) Aluminium

9. The intensity ratio of the maxima and minima in an interference pattern produced by two coherent sources of light is 9 : 1. The intensities of the used light sources are in the ratio: **[1]**

a) 3 : 1

b) 9 : 1

c) 10 : 1

d) 4 : 1

10. Consider a neutral conducting sphere. A positive point charge is placed outside the sphere. Then the net charge on the sphere is - **[1]**

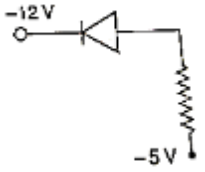
a) Negative and distributed non–uniformly over the entire surface of the sphere

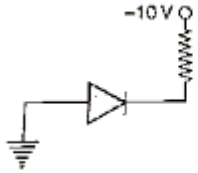
b) Negative and appears only at the point on the sphere closest to the point charge

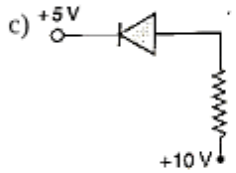
c) Negative and distributed uniformly over the surface of the sphere

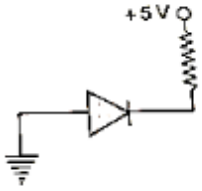
d) Zero

11. In the following figures, which one of the diodes is reverse biased? **[1]**

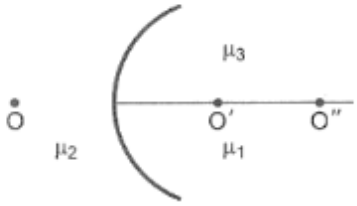
a) 

b) 

c) 

d) 

12. Figure shows three transparent media of refractive indices μ_1, μ_2 and μ_3. A point object O is placed in the medium μ_2. If the entire medium on the right of the spherical surface has refractive index μ_1, the image forms at O'. If this entire medium has refractive index μ_3, the image forms at O''. In the situation shown in the figure given ahead: **[1]**



a) the image forms to the right of O''

b) the image forms to the left of O'

c) the image forms between O' and O''

d) two images form, one at O' and the other at O''

13. **Assertion (A):** The de Broglie equation has significance for any microscopic or sub-microscopic particle. **[1]**
Reason (R): The de Broglie wavelength is inversely proportional to the mass of the object if velocity is constant.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

14. **Assertion:** The capacity of a conductor, under given circumstances, remains constant irrespective of the charge present on it. **[1]**
Reason: Capacity depends on size and shape of a conductor and also on the surrounding medium.

a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

c) Assertion is correct statement but reason is wrong statement.

d) Assertion is wrong statement but reason is correct statement.

15. **Assertion (A):** Thin films such as soap bubble or a thin layer of oil on water show beautiful colours when illuminated by monochromatic light. **[1]**
Reason (R): The colours are obtained by dispersion of light.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

16. **Assertion (A):** At resonance, the current becomes minimum in a series LCR circuit. **[1]**
Reason (R): At resonance, voltage and current are phase in a series LCR circuit.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

Section B

17. Given: Wavelength of light in mercury is $5.5 \times 10^{-5} cm$. **[2]**

    i. Calculate its frequency and period.

    ii. What is the wavelength of the light in the glass, if the refractive index of glass is 1.5?

18. Find the percent increase in the magnetic field B when the space within a current-carrying toroid is filled with aluminium. The susceptibility of aluminium is 2.1×10^{-5}. **[2]**

OR

A magnetising field of 1500 A/m produces a magnetic flux of 2.4×10^{-5} weber in a bar of iron of crosssection 0.5 cm^2. Calculate permeability and susceptibility of the iron-bar used.

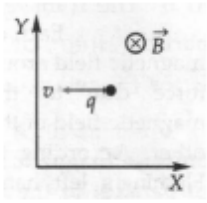
19. A potential barrier of 0.60 V exists across a p-n junction, **[2]**

    i. If the depletion region is 6.0×10^{-7} m thick, what is the intensity of the electric field in this region?

    ii. If an electron with speed 5.0×10^{5} ms^{-1} approaches the p-n junction from the n-side, with what speed will it enter the p-side?

20. Suppose you are given a chance to repeat the alpha particle scattering experiment using a thin sheet of solid hydrogen in place of the gold foil. (Hydrogen is a solid at temperatures below 14 K). What results do you expect? **[2]**

21. a. A point charge q moving with speed v v enters a uniform magnetic field B that is acting into the plane of the paper as shown. What is the path followed by the charge q and in which plane does it move? **[2]**

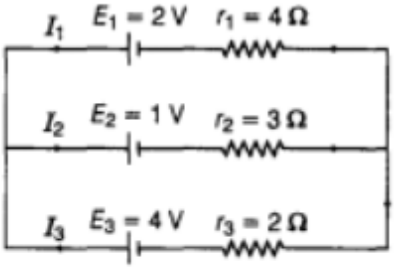


    b. How does the path followed by the charge get affected if its velocity has a component parallel to B?

    c. If an electric $\vec{E}$ is also applied such that the particle continues moving along the original straight line path, what would be the magnitude and direction of the electric field $\vec{E}$?

Section C

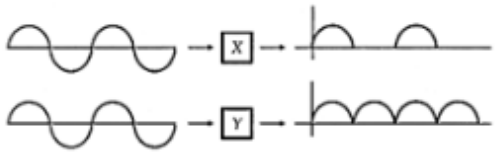
22. State Kirchhoff's rules. Use these rules to write the expressions for the currents I_1, I_2 and I_3 in the circuit diagram shown in figure below. **[3]**



23. a. State briefly, with what purpose was Davisson and Germer experiment performed and what inference was drawn from this. **[3]**

    b. Obtain an expression for the ratio of the accelerating potentials required to accelerate a proton and an α-particle to have the same de-Broglie wavelength associated with them.

24. An a.c. the signal is fed into two circuits X and Y and the corresponding output in the two cases have the waveforms shown in the figure. Name the circuits X and Y. Also draw their detailed circuit diagrams. **[3]**



25. Describe how Chadwick discovered neutrons. Is neutron a stable particle when isolated? **[3]**

26. The energy of a hydrogen atom in the first excited state is -3.4 eV. Find: **[3]**

a. the radius of this orbit. (Take Bohr radius = 0.53 $\mathring{A}$)

b. the angular momentum of the electron in the orbit.

c. the kinetic and potential energy of the electron in the orbit.

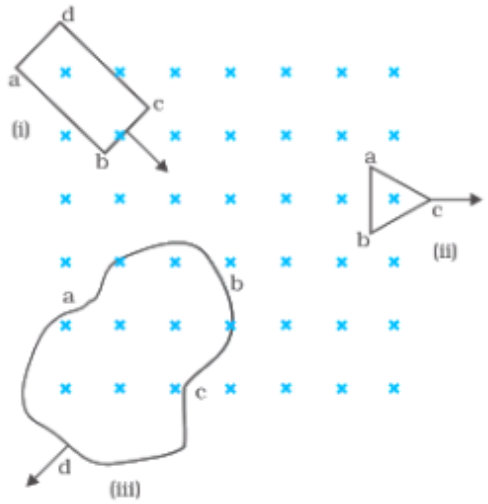
27. Answer the following questions: **[3]**

a. In a single slit diffraction experiment, the width of the slit is made double the original width. How does this affect the size and intensity of the central diffraction band?

b. How is the width of the central maximum changed when red light is replaced by blue?

c. In what way is diffraction from each slit related to the interference pattern in a double slit experiment?

28. In Figure, shows planar loops of different shapes moving out of or into a region of a magnetic field which is directed normal to the plane of the loop away from the reader. Determine the direction of induced current in each loop using Lenz's law. **[3]**



OR

Define the term mutual inductance between the two coils. Obtain the expression for mutual inductance of a pair of long co-axial solenoids each of length l and radii r_1 and r_2 ($r_2 >> r_1$). The total number of turns in the two solenoids are N_1 and N_2 respectively.

Section D

29. **Read the text carefully and answer the questions:** **[4]**

All the known radiations from a big family of electromagnetic waves which stretch over a large range of wavelengths. Electromagnetic wave include radio waves, microwaves, visible light waves, infrared rays, UV rays, X-rays and gamma rays. The orderly distribution of the electromagnetic waves in accordance with their wavelength or frequency into distinct groups having widely differing properties is electromagnetic spectrum.

(a) Which wavelength of the Sun is used finally as electric energy?

radio waves, infrared waves, visible light, microwaves

a) infrared waves b) radio waves

c) microwaves d) visible light

(b) Which of the following electromagnetic radiations have the longest wavelength?

X-rays, γ-rays, microwaves, radiowaves

a) γ-rays
b) X-rays
c) microwaves
d) radiowaves

(c) Which one of the following is not electromagnetic in nature?

X-rays, gamma rays, cathode rays, infrared rays

a) infrared rays
b) gamma rays
c) cathode rays
d) X-rays

OR

The decreasing order of wavelength of infrared, microwave, ultraviolet and gamma rays is

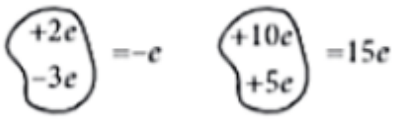
a) microwave, gamma rays, infrared, ultraviolet
b) infrared, microwave, ultraviolet, gamma rays.
c) gamma rays, ultraviolet, infrared, microwave
d) microwave, infrared, ultraviolet, gamma rays

(d) Which of the following has minimum wavelength?

X-rays, ultraviolet rays, γ-rays, cosmic rays

a) ultraviolet rays
b) X-rays
c) cosmic rays
d) γ-rays

30. The smallest charge that can exist in nature is the charge of an electron. During friction, it is only the transfer of electrons that makes the body charged. Hence net charge on anybody is an integral multiple of the charge of an electron [1.6×10^{-19} C] i.e. **[4]**



$q = \pm ne$

where n = 1, 2, 3, 4,...

Hence nobody can have a charge represented as 1.1e, 2.7e, $\frac{3}{5}$ e, etc.

Recently, it has been discovered that elementary particles such as protons or neutrons are composed of more elemental units called quarks.

i. Find the number of electrons if the body has 3.2×10^{-18} C of charge.

ii. If a charge on a body is 1 nC, then how many electrons are present on the body?

iii. If a body gives out 10^9 electrons every second, how much time is required to get a total charge of 1 C from it?

iv. A polythene piece rubbed with wool is found to have a negative charge of 3.2×10^{-7} C. Calculate the number of electrons transferred.

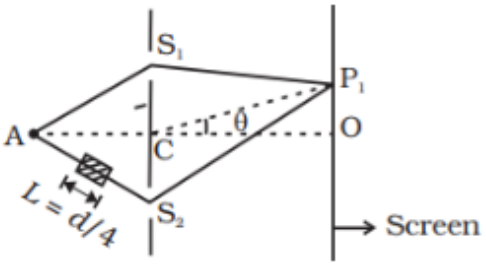
Section E

31. i. A coin is placed inside a denser medium. Why does it appear to be raised? Obtain an expression for the height through which the object appears to be raised in terms of refractive index of the medium and real depth. **[5]**

ii. A compound microscope consists of an objective lens of focal length 2 cm and an eyepiece of focal length 6.25 cm separated by a distance of 15 cm. How far from the objective should an object be placed in order to obtain the final image at the least distance of distinct vision (25 cm)? Calculate the magnifying power of the microscope.

OR

A small transparent slab containing material of $\mu = 1.5$ is placed along AS_2 (Figure). What will be the distance from O of the principal maxima and of the first minima on either side of the principal maxima obtained in the absence of the glass slab?



$AC = CO = D$, $S_1C = S_2C = d << D$

32. i. Obtain an expression for the potential energy of an electric dipole placed in a uniform electric field. **[5]**

ii. Three capacitors of capacitance C_1, C_2 and C_3 are connected in series to a source of V volt. Show that the total energy stored in the combination of capacitors is equal to sum of the energy stored in individual capacitors.

iii. A capacitor of capacitance C is connected across a battery. After charging, the battery is disconnected and the separation between the plates is doubled. How will (i) the capacitance of the capacitor, and (ii) the electric field between the plates be affected? Justify your answer.

OR

a. Derive the expression for the electric potential due to an electric dipole at a point on its axial line.

b. Depict the equipotential surfaces due to an electric dipole.

33. A small town with a demand of 800 kW of electric power at 220 V is situated 15 km away from an electric plant generating power at 440 V. The resistance of the two wirelines carrying power is 0.5 Ω per km. The town gets power from the line through a 4000 - 220 V step-down transformer at a sub-station in the town. **[5]**

a. Estimate the line power loss in the form of heat.

b. How much power must the plant supply, assuming there is negligible power loss due to leakage?

c. Characterize the step-up transformer at the plant.

OR

i. With the help of a labelled diagram, describe the principle and working of an ac generator. Hence, obtain an expression for the instantaneous value of the emf generated.

ii. The coil of an ac generator consists of 100 turns of wire, each of area 0.5 m^2. The resistance of the wire is 100 Ω. The coil is rotating in a magnetic field of 0.8 T perpendicular to its axis of rotation, at a constant angular speed of 60 radian per second. Calculate the maximum emf generated and power dissipated in the coil.