CBSE EXAMINATION PAPER-2026

PHYSICS

(Solved)

Time allowed : 3 hours | Maximum Marks : 82

General Instructions :

Read the following instructions carefully and follow them :

i. This question paper contains **38 questions.** All questions are **compulsory.**

ii. This question paper is divided into **5 sections.**

iii. **Section A** – questions number **1 to 2** are case based questions

iv. **Section B** – questions number **3 to 18** are multiple choice questions

v. **Section C** – questions number **19 to 24** are very short answer

vi. **Section D** – questions number **25 to 32** are short answer

vii. **Section E** – questions number **33 to 38** are long answer

viii. There is no overall choice given in the question paper. However, an internal choice has been provided in few questions.

ix. Use of calculator is NOT allowed.

Section A

Question 1.

A galvanometer is used to detect or /and measure small currents in an electric circuit. It essentially works on the fact that a current-carrying coil experiences a deflecting torque when placed in a magnetic field. This deflection in the coil can be measured and it is related to the current flowing in the coil, the number of turns in the coil, area of the coil and magnetic field. A hair spring attached to the coil provides a counter torque and helps in measuring the deflection. A galvanometer can be converted to an ammeter or a voltmeter of desired range by using suitable resistances.

(1)

The torque on the coil remains constant irrespective of the coil's orientation during rotation due to

(A) use of soft iron core which increases the magnetic field.

(B) radial magnetic field

(C) hair spring which provides the counter torque

(D) eddy current in the iron core which causes damping.

[1 Marks]

(2)

The best way to increase current sensitivity of a galvanometer is by

(A) increasing number of turns of the coil

(B) increasing area of coil and magnetic field strength

(C) decreasing area of coil and magnetic field strength

(D) increasing torsional constant of the hair spring

[1 Marks]

(3)

A moving coil galvanometer has a coil with area of cross-section 4.0×10^{-3} m² and number of turns 50. The coil is rotating in a magnetic field of 0.25 T. The torque acting on the coil when a current of 5 A passes through it is

(A) 1.0 N m

(B) 2.0 N m

(C) 0.50 N m

(D) 0.25 N m

[1 Marks]

(4)

A galvanometer coil has a resistance of 15 Ω and the meter shows full scale deflection for a current of 3 mA. The value of resistance required to convert it into a voltmeter of range (0 – 12 V) is

(A) 4015 Ω

(B) 3985 Ω

(C) 415 Ω

(D) 385 Ω

[1 Marks]

(5)

A galvanometer with coil of resistance 20 Ω shows full scale deflection for a current of 5 mA. To convert it into an ammeter of range (0 – 10 A), a resistance of

(A) 0.05 Ω should be connected in series with it.

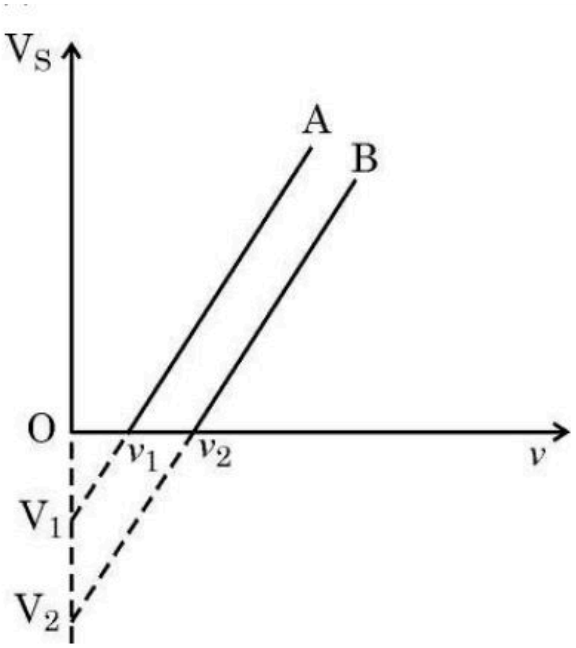
(B) 0.05 Ω should be connected in parallel with it.

(C) 0.01 Ω should be connected in parallel with it.

(D) 0.01 Ω should be connected in series with it.

[1 Marks]

Question 2. A researcher performs an experiment on photo-electric effect using two metals A and B with unknown work functions. She illuminates the surfaces of A and B with monochromatic radiation of various frequencies and records the value of corresponding stopping potentials (Vs). The graph shows the variation of stopping potential (Vs) with the frequency of incident radiation (ν) for metals A and B.



(1)

(I) From the graph, the work functions of A and B are (h is Planck's constant and e value of charge on an electron)

(A) ν_1 and ν_2

(B) V_1 and V_2

(C) $h\nu_1$ and $h\nu_2$

(D) $h\nu_1/e$ and $h\nu_2/e$

[1 Marks]

(2)

If the intensity of the incident radiation for both metals A and B, is doubled keeping its frequency constant, then

(A) the slope of the parallel lines will increase.

(B) the slope of the parallel lines will decrease.

(C) the threshold frequencies for both A and B will decrease.

(D) the slope of the parallel lines will not change but more electrons will be emitted per second.

[1 Marks]

(3)

For radiation of frequency $\nu > \nu_2$ incident on the surfaces of A and B, the maximum kinetic energy of ejected electron is

(A) greater for metal A because it has a smaller work function.

(B) greater for metal B because it has a larger work function.

(C) greater for metal B because it has higher threshold frequency.

(D) the same for both metal A and metal B because it is independent of work functions of metals.

[1 Marks]

(4)

The threshold frequency for a metal surface is ν_o. If the radiation of frequency $3\nu_o$ illuminates the surface, the maximum kinetic energy (KE) of photoelectrons is E_1. If the frequency were increased to $6\nu_o$, the maximum KE of the photoelectrons becomes E_2. Then $\square E_1/E_2 \square$ equals

(A) 1/3

(B) 1/2

(C) 2/5

(D) 3/4

[1 Marks]

(5)

Let m be the slope of the graph line for metal B. If e is the value of electron charge, then Planck's constant 'h' is given by

(A) me

(B) 1/me

(C) m/e

(D) e/m

[1 Marks]

Section B

Question 3.

In a region, the electric potential varies as V = 10 – 50x, where V is in volts and x in meters. The electric field in the region is:

[1 Marks]

(A) 10 N/C along −x

(B) 10 N/C along +x

(C) 50 N/C along +x

(D) 50 N/C along −x

Question 4.

A conducting wire connects two charged metallic spheres A and B of radii r_1 and r_2, respectively. The distance between the spheres is very large compared to their radii. The ratio of electric fields, (E_A/E_B) at the surfaces of spheres A and B will be

[1 Marks]

(A) r_1^2 / r_2^2

(B) r_2^2 / r_1^2

(C) r_2 / r_1

(D) r_1/r_2

Question 5.

A long straight wire of circular cross-section (radius a) carries a steady current I. The current is uniformly distributed across this cross-section. The magnitude of the magnetic field produced at a point at a distance (a/2) from the axis of the wire will be

[1 Marks]

(A) $\mu_0 I/6\pi a$

(B) $\mu_0 I/4\pi a$

(C) Zero

(D) $\mu_0 I/2\pi a$

Question 6. The shape of the interference fringes in Young's double-slit experiment, when the distance between the slit and the screen is very large as compared to the slit-separation, is nearly

[1 Marks]

(A) straight

(B) parabolic

(C) hyperbolic

(D) circular

Question 7.

An electromagnetic wave passes from vacuum into a dielectric medium with relative electrical permittivity (3/2) and relative magnetic permeability (8/3). Then, its

[1 Marks]

(A) wavelength and frequency both will remain unchanged

(B) wavelength is halved and frequency remains unchanged

(C) wavelength is doubled and frequency remains unchanged

(D) wavelength is doubled and frequency is halved

Question 8.

In a series LCR circuit, the voltage across the resistor, capacitor and inductor is 10 V each. If the capacitor is short circuited, the voltage across the inductor will be

[1 Marks]

(A) 10 V

(B) $10\sqrt{2}$ V

(C) $5/\sqrt{2}$ V

(D) $5\sqrt{2}$ V

Question 9. Electromagnetic waves used in a diagnostic tool in medicine have a wavelength range

[1 Marks]

(A) 1 nm to 10^{-3} nm

(B) 400 nm to 1 nm

(C) 1 mm to 700 nm

(D) 0.1 m to 1 mm

Question 10.

The 'distance of closest approach' of an alpha-particle is 'd' when it moves with a velocity v head-on towards the target nucleus. If the velocity of alpha particle is halved, the new 'distance of closest approach' will be –

[1 Marks]

(A) 4d

(B) d/2

(C) d/4

(D) 2d

Question 11. A concave lens of focal length 10 cm is cut into two identical plano-concave lenses. The focal length of each lens will be

[1 Marks]

(A) 20 cm

(B) 30 cm

(C) 40 cm

(D) 5 cm

Question 12.

Four independent waves are expressed as (i) $y_1 = A_1 \sin \omega t$ (ii) $y_2 = A_2 \sin 2\omega t$ (iii) $y_3 = A_3 \cos \omega t$ (iv) $y_4 = A_4 \sin (\omega t + \pi/3)$ The interference between two of these waves is possible in

[1 Marks]

(A) (i) and (iii) only

(B) (iii) and (iv) only

(C) (i), (iii) and (iv) only

(D) All of them

Question 13.

Two heaters rated as (P_1, V) and (P_2, V) are connected in series across a dc source of V/2 volt. The power consumed by the combination will be –

[1 Marks]

(A) $P_1P_2/4(P_1 + P_2)$

(B) $(P_1 + P_2)$

(C) $P_1P_2/2(P_1 + P_2)$

(D) $(P_1 + P_2)/2$

Question 14.

In an unbiased p-n junction, at equilibrium, which of the following statements is true ?

[1 Marks]

(A) Diffusion and drift currents are equal and opposite

(B) Both the diffusion and drift currents exist but are unequal

(C) Diffusion current is zero but drift current exists

(D) Diffusion current exists but drift current is zero.

Question 15.

Assertion (A): All atoms have a net magnetic moment. Reason (R): A current loop does not always behave as a magnetic dipole.

[1 Marks]

(A) Assertion (A) is true, but Reason (R) is false

(B) Both Assertion (A) and Reason (R) are false

(C) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A)

(D) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A)

Question 16. Assertion (A): If accelerated electrons are passed through a narrow slit, a diffraction pattern is observed. Reason (R): Electrons behave as both particles and waves.

[1 Marks]

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A)

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A)

(C) Assertion (A) is true, but Reason (R) is false

(D) Both Assertion (A) and Reason (R) are false

Question 17.

Assertion (A): The mass of a nucleus is less than the sum of the masses of the constituent nucleons. Reason (R): Energy is absorbed when the nucleons are bound together to form a nucleus.

[1 Marks]

(A) Assertion (A) is true, but Reason (R) is false

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A)

(C) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A)

(D) Both Assertion (A) and Reason (R) are false

Question 18.

Assertion (A): In Bohr model of hydrogen atom, the energy levels are discrete and quantised. Reason (R): In a hydrogen atom, the electrostatic force on the electron provides the necessary centripetal force to it to revolve around the nucleus.

[1 Marks]

(A) Assertion (A) is true, but Reason (R) is false

(B) Both Assertion (A) and Reason (R) are false

(C) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A)

(D) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A)

Section C

Question 19.

In a photoelectric experiment, the emitter plate is irradiated with radiation of 200 nm. The photocurrent becomes zero when the collector plate potential is –0.80 V. Calculate the work function (in eV) of the emitter.

[2 Marks]

Question 20.

A beam of light consisting of two wavelengths 400 nm and 600 nm is used to illuminate a single slit of width 1 mm. Find the least distance of the point from the central maximum where the dark fringes due to both wavelengths coincide on the screen placed 1.5 m from the slit.

[2 Marks]

Question 21.

In a Young's double-slit experimental set-up with slit separation 0.6 mm, a beam of light consisting of two wavelengths 440 nm and 660 nm is used to obtain interference pattern on a screen kept 1.5 m in front of the slits. Find the least distance of the point from the central maximum where the bright fringes due to both the wavelengths coincide.

[2 Marks]

Question 22.

A wire of length L is bent round into (i) a square coil having N turns and (ii) a circular coil having N turns. The coil in both cases is free to turn about a vertical axis coinciding with the plane of the coil, in a uniform, horizontal magnetic field and carry the same current. Find the ratio of the maximum value of the torque acting on the square coil to that on the circular coil.

[2 Marks]

Question 23.

What is the order of magnitude of drift velocity of electrons in a conductor? Deduce the relation between the current flowing through a conductor and drift velocity of electrons in it.

[2 Marks]

Question 24.

Draw the plot of potential energy of a pair of nucleons as a function of their separation. Write two important conclusions that can be drawn from this plot.

[2 Marks]

Section D

Question 25.

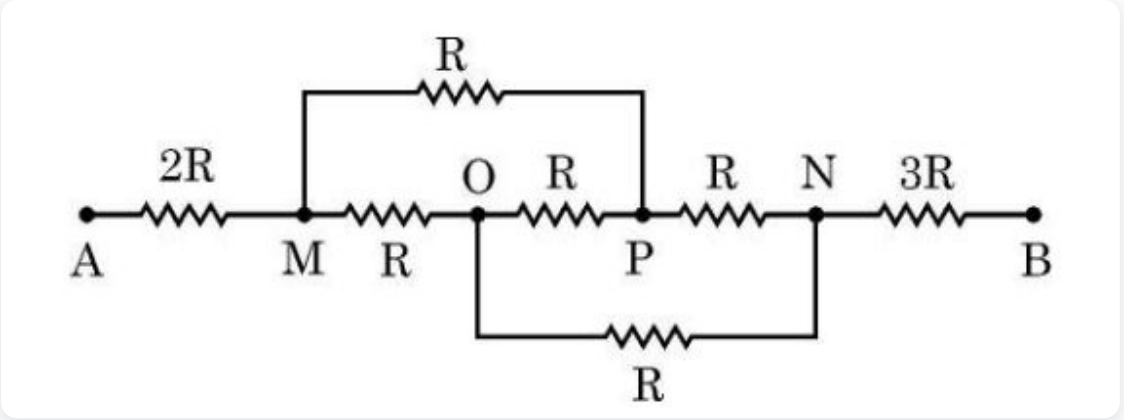
(a) Using Gauss's law, deduce an expression for electric field at a point due to a uniformly charged infinite plane thin sheet.
(b) Two large thin plane sheets, each having surface charge density σ, are held close and parallel to each other in air. What is the net electric field at a point (i) inside and (ii) outside, the sheets?

[3 Marks]

Question 26.

(a) Obtain the condition of balance of a Wheatstone bridge.
(b) Find net resistance of the network of resistors connected between A and B, as shown in figure.

[3 Marks]



Question 27.

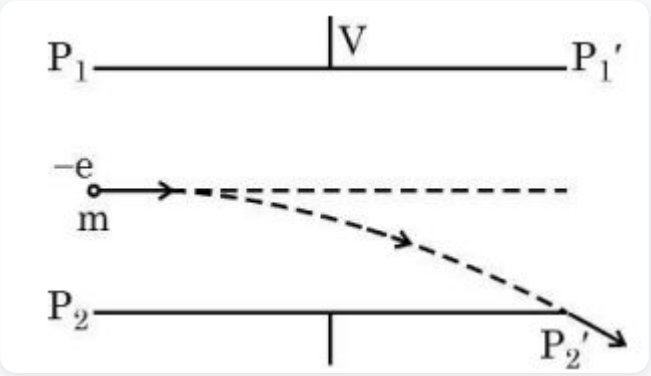
A parallel plate capacitor of capacitance C has a dielectric slab between its plates. It is charged to a potential difference V by connecting it across a battery. The battery is then disconnected. If the dielectric slab is now withdrawn from the capacitor, how will the following be affected?
(a) Capacitance of the capacitor,
(b) Energy stored in the capacitor, and
(c) The potential difference between the plates of the capacitor.
Justify your answer in each case.

[3 Marks]

Question 28.

Figure shows a narrow beam of electrons entering with a velocity of 3 × 10^7 m/s, symmetrically through the space between two parallel horizontal plates P_1P_1' and P_2P_2' kept 2 cm apart.
If each plate is 3 cm long, calculate the potential difference V applied between the plates so that the beam just strikes the end P_2' .

[3 Marks]

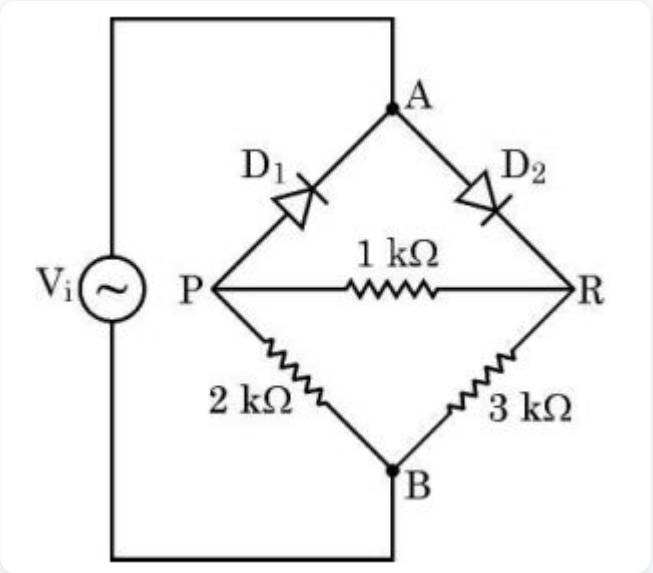


Question 29.

An ac voltage V_i = 12 sin (100πt) V is applied between points A and B in a network of two ideal diodes and three resistors as shown in figure. During the positive half-cycle of the input voltage V_i supplied to the network,
(a) Identify which of the two diodes will conduct and why?

(b) Redraw an equivalent circuit diagram to show the flow of current.
(c) Calculate the output voltage drops V_0 across the three resistors when the input voltage attains its peak value.

[3 Marks]



Question 30.

Briefly explain the two important processes that occur during the formation of a p-n junction.

[3 Marks]

Question 31.

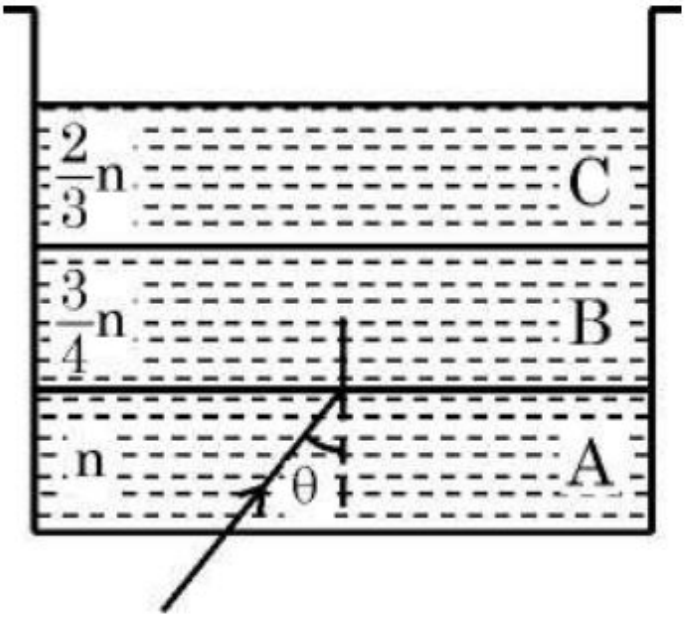
(a) Draw the ray diagram to show the image formation by a refracting telescope and write the expression for angular magnification for the telescope in normal adjustment.
(b) Give two reasons why a reflecting telescope is preferred over a refracting telescope.

[3 Marks]

Question 32.

(a) State the two conditions under which total internal reflection occurs.
(b) A transparent container contains layers of three immiscible transparent liquids A, B and C of refractive indices n, 3/4n and 2/3 n respectively. A laser beam is incident at the interface between A and B at an angle θ as shown in figure. Prove that the beam does not enter region C at all for $\sin\theta \geq 2/3$.

[3 Marks]



Section E

Question 33.

(a) An electric dipole consists of two point charges q and –q separated by a distance 2a. Derive an expression for the electric field □□ due to this dipole at a point distant r from the centre of the dipole on the equatorial plane. Write the expression for the electric field at a far off point, i.e. r >> a.
(b) A dipole is placed in x-y plane such that charges q and –q are located at x = a and x = b respectively. There exists an electric field □□ = 2 î N/C in the region. Calculate the force □□ and torque **τ(vector)** experienced by the dipole.

[5 Marks]

Question 34.

(a) Two cells of emf E_1 and E_2 with internal resistances r_1 and r_2 respectively, are connected in parallel by connecting their positive terminals together and negative terminals together. Deduce an expression for equivalent emf and equivalent internal resistance of the combination.
(b) A parallel combination, as stated in (a) above, of two cells of emfs E and 3E and internal resistances R each is connected across a resistance 2R. Find the current that flows through resistance 2R.

[5 Marks]

Question 35.

(a) Using the relation for refraction at a curved spherical surface, derive the expression for lens maker's formula.
(b) Three lenses L_1, L_2 and L_3, each of focal length 40 cm, are placed coaxially. The distance between

L_1 and L_2 and between L_2 and L_3 are 120 cm and 20 cm respectively. An object is kept at a distance of 80 cm to the left of lens L_1.
Find the distance of the final image formed from the object.

[5 Marks]

Question 36.

(a) Draw a ray diagram to show the image formation by a concave mirror when the object is kept between its focus and the centre of curvature. Using this diagram, derive the mirror formula.
(b) A concave mirror produces a two times magnified virtual image of an object kept 10 cm in front of it. Calculate the focal length of the mirror.

[5 Marks]

Question 37.

(a) State Faraday's law of electromagnetic induction.
(b) Derive an expression for the self-inductance of an air-filled long solenoid of length l and cross-sectional area A having N turns.

(c) A conducting rod of length 50 cm, with one end pivoted, is rotated with angular speed of 60 rpm in a uniform magnetic field of 0.40 mT directed perpendicular to the plane of rotation of rod. Find the emf induced in the rod.

[5 Marks]

Question 38.

(a) Draw a labelled diagram of a step-up transformer. State the principle on which it works and obtain the ratio of secondary voltage to primary voltage in terms of number of turns and currents in the two coils.
(b) The ratio of the number of turns in the primary to the secondary of an ideal transformer is 1 : 5. If 5 kW power at 200 V is supplied to the primary, find
(i) current in the primary, and
(ii) output voltage.

[5 Marks]