CBSE EXAMINATION PAPER-2025

PHYSICS

(Solved)

Time allowed : 3 hours | Maximum Marks : 37

General Instructions :

Read the following instructions carefully and follow them :

i. This question paper contains **17 questions.** All questions are **compulsory.**

ii. This question paper is divided into **4 sections.**

iii. **Section A** – questions number **1 to 9** are multiple choice questions Each question carries **1 marks.**

iv. **Section B** – questions number **10 to 11** are very short answer Each question carries **2 marks.**

v. **Section C** – questions number **12 to 14** are short answer Each question carries **3 marks.**

vi. **Section D** – questions number **15 to 17** are long answer Each question carries **5 marks.**

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

viii. Use of calculator is NOT allowed.

Section A

Question 1.

Two wires P and Q are made of the same material. The wire Q has twice the diameter and half the length as that of wire P. If the resistance of wire P is R, the resistance of the wire Q will be:

[1 Marks]

(A) 2R

(B) R/8

(C) R/2

(D) R

Question 2.

A coil has 100 turns, each of area 0.05 m^2 and total resistance 1.5 Ω. It is inserted at an instant in a magnetic field of 90 mT, with its axis parallel to the field. The charge induced in the coil at that instant is:

[1 Marks]

(A) 0.45 C

(B) 0.30 C

(C) 3.0 mC

(D) 1.5 C

Question 3.

Assertion (A): It is difficult to move a magnet into a coil of large number of turns when the circuit of the coil is closed.

Reason (R): The direction of induced current in a coil with its circuit closed, due to motion of a magnet, is such that it opposes the cause.

[1 Marks]

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

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

(C) Both Assertion (A) and Reason (R) are false.

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

Question 4.

The given diagram exhibits the relationship between the wavelength of the electromagnetic waves and the energy of photon associated with them. The three points P, Q and R marked on the diagram may correspond respectively to :

[1 Marks]

(A) X-rays, microwaves, UV radiation

(B) X-rays, UV radiation, microwaves

(C) UV radiation, microwaves, X-rays

(D) Microwaves, UV radiation, X-rays

Question 5.

A beaker is filled with water (refractive index 4/3) upto a height H. A coin is placed at its bottom. The depth of the coin, when viewed along the near normal direction, will be

[1 Marks]

(A) H/4

(B) 4H/3

(C) H

(D) 3H/4

Question 6.

Which of the following figures correctly represent the shape of curve of binding energy per nucleon as a function of mass number ?

[1 Marks]

(A)

(B)

(C)

(D)

Question 7.

When a p-n junction diode is forward biased

[1 Marks]

(A) the barrier height and the depletion layer width both increase.

(B) the barrier height increases and the depletion layer width decreases.

(C) the barrier height and the depletion layer width both decrease.

(D) the barrier height decreases and the depletion layer width increases.

Question 8.

Assertion (A) : The deflection in a galvanometer is directly proportional to the current passing through it.

Reason (R) =: The coil of a galvanometer is suspended in a uniform radial magnetic field.

[1 Marks]

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

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

(C) Assertion (A) is false and Reason (R) is also false.

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

Question 9.

Assertion (A) : The potential energy of an electron revolving in any stationary orbit in a hydrogen atom is positive.

Reason (R) : The total energy of a charged particle is always positive.

[1 Marks]

(A) Assertion (A) is false and Reason (R) is also false.

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

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

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

Section B

Question 10. A battery of emf E and internal resistance r is connected to a resistor. When a current of 2A is drawn from the battery, the potential difference across the resistor is 5V. The potential difference becomes 4V when a current of 4A is drawn from the battery. Calculate the value of E and r.

[2 Marks]

Question 11.

In a diffraction experiment, the slit is illuminated by light of wavelength 600 nm. The first minimum of the pattern falls at an angle of 30°. Calculate the width of the slit.

[2 Marks]

Section C

Question 12.

Two batteries of emfs 3V & 6V and internal resistances 0.20**Ω** & 0.4**Ω** are connected in parallel. This combination is connected to a 4**Ω** resistor. Find :

i) the equivalent emf of the combination

ii) the equivalent internal resistance of the combination

iii) the current drawn from the combination

[3 Marks]

Question 13.

Answer the following giving reason :

(a) All the photo electrons do not eject with the same kinetic energy when monochromatic light is incident on a metal surface.

(b) The saturation current in case (a) is different for different intensity.

(c) If one goes on increasing the wavelength of light incident on a metal

surface, keeping its intensity constant, emission of photo electrons

stop at a certain wavelength for this metal.

[3 Marks]

Question 14.

(a) Draw circuit arrangement for studying V-I characteristics of a p-n junction diode.

(b) Show the shape of the characteristics of a diode.

(c) Mention two information that you can get from these characteristics.

[3 Marks]

Section D

Question 15.

(i) Consider three metal spherical shells A, B and C, each of radius R. Each shell is having a concentric metal ball of radius R/10. The spherical shells A, B and C are given charges +6q, —4q, and 14q respectively. Their inner metal balls are also given charges —2q, +8q and — 10q respectively. Compare the magnitude of the electric fields due to shells A, B and C at a distance 3R from their centres.

(ii) A charge —6 μC is placed at the centre B of a semicircle of radius 5 cm, as shown in the figure. An equal and opposite charge is placed at point D at a distance of 10 cm from B. A charge +5 μC is moved from point 'C' to point 'A' along the circumference. Calculate the work done on the charge.

[5 Marks]

Question 16.

(i) (1) What are coherent sources ? Why are they necessary for observing a sustained interference pattern?

(2) Lights from two independent sources are not coherent. Explain.

(ii) Two slits 0.1 mm apart are arranged 1.20 m from a screen. Light of wavelength 600 nm from a distant source is incident on the slits.

(1) How far apart will adjacent bright interference fringes be on the screen ?

(2) Find the angular width (in degree) of the first bright fringe.

[5 Marks]

Question 17.

(i) Define a wavefront. An incident plane wave falls on a convex lens and gets refracted through it. Draw a diagram to show the incident and refracted wavefront.

(ii) A beam of light coming from a distant source is refracted by a spherical glass ball (refractive index 1.5) of radius 15 cm. Draw the ray diagram and obtain the position of the final image formed.

[5 Marks]