CBSE Class 12 Physics 2025-26

Important Questions

1. Electric Charges and Fields

Q.No.1: What is electric flux? Write its S.I. units. Using Gauss's theorem, deduce an expression for the electric field at a point due to a uniformly charged infinite plane sheet.

Q.No.2: State Gauss's law on electrostatics and derive an expression for the electric field due to a long straight thin uniformly charged wire (linear charge density λ) at a point lying at a distance r from the wire.

2. Electrostatic Potential and Capacitance

Q.No.1: A 4000 pF air-gap capacitor is connected to a 30 V battery. If a piece of glass is placed between the plates, how much more charge will flow from the battery? Dielectric constant of glass is 9.

Answer: 0.96 μC

Q.No.2: An electric field of 600 N/C is desired between the capacitor plates kept 2 mm apart. What value of potential difference must be applied across the plates?

Answer: 1.2 V

Q.No.3: Two capacitors C1 = 10 μF and C2 = 15 μF are connected in parallel and the resulting combination is connected to a 12 V battery. Find

(a) the equivalent capacitance of combination

(b) The potential difference across each capacitor

(c) The charge stored on each capacitor

Answer: (a) 25 μF, (b) 12 V, (c) 180 μC

3. Current Electricity

Q.No.1: Derive the dimensional formula of resistance.

Q.No.2: A 5 A fuse in a particular household blows off repeatedly. Why is it dangerous to replace it with a 15 A fuse?

Q.No.3: Derive an expression for the resistivity of a good conductor in terms of the relaxation time of electrons.

4. Moving Charges and Magnetism

Q.No.1: Depict the magnetic field lines due to a circular current-carrying loop in an anticlockwise direction, showing the direction of the field lines.

Q.No.2: The magnetic field at the centre of a current-carrying circular loop of radius R, is B1. The magnetic field at a point on its axis at a distance R from the center of the loop is B2. What is the ratio of the magnetic field?

Answer: 2 root 2

5. Magnetism and Matter

Q.No.1: Calculate the torque on a 120 turn rectangular coil of size 20 cm x 10 cm, carrying a current of 5 A and placed at an angle of 45° with a uniform magnetic field of 4 T.

Answer: 33. 94 Nm

Q.No.2: Write the important properties of the magnetic field lines due to a bar magnet.

Q.No.3: (a) What is meant by magnetic susceptibility? Write its dimensional formula.

(b) Briefly explain the temperature dependence of susceptibility for diamagnetism, paramagnetism and ferromagnetism from a molecular viewpoint.

6. Electromagnetic Induction

Q.No.1: In an inductor of inductance 24 H, the amount of current changes from 14 A to 6 A in 0.5 s. Calculate the amount of emf induced in the inductor.

Answer: 384 V

Q.No.2: How is the mutual inductance of a pair of conducting coils affected when:

(i) Separation between the coils is increased?

(ii) The number of turns of each coil is increased?

(iii) A thin iron sheet is placed between the two coils, other factors remaining the same?

Explain your answer in each case.

7. Alternating Current

Q.No.1: State the underlying principle of a transformer. How is the large-scale transmission of electric energy over long distances done with the use of transformers?

Q.No.2: Define capacitor reactance. Write its SI units.

8. Electromagnetic Waves

Q.No.1: What is visible light? What is its wavelength range? How is it produced?

Q.No.2: Out of microwaves, ultraviolet rays and gamma rays, which radiation will be most effective for emission of electrons from a metallic surface and why?

Q.No.3: How are infrared waves produced? Write any two uses of the waves.

9. Ray Optics and Optical Instruments

Q.No.1: What is the reason for the diamond sparkle? Do the diamonds found in nature show the same sparkling brilliance?

Q.No.2: What is the focal length of a system of two lenses of power 8 D and −4 D placed in contact?

Answer: 25 cm.

10. Wave Optics

Q.No.1: Write any two differences between diffraction and interference.

Q.No.2: Two slits are made 2 mm apart, and the screen is placed one metre away in a Young's double slit experiment. What is the fringe separation when a light of wavelength 450 nm is used?

Answer: 0.225 mm.

Q.No.3: What is the effect on the interference fringes in Young's double-slit experiment if the source slit is moved closer to the double slit plane?

11. Dual Nature of Radiation and Matter

Q.No.1: Define the following terms:

1. Saturation current

2. Stopping potential

Q.No.2: Wilhelm Hallwachs and Philipp Lenard investigated the phenomenon of photoelectric emission in detail during 1886-1902. Hallwachs, in 1888, undertook the study further and connected a negatively charged zinc plate to an electroscope. What happens to:

(i) a negatively charged zinc plate when it is irradiated by ultraviolet light?

(ii) an uncharged zinc plate when it is irradiated by ultraviolet light?

(iii) a positively charged zinc plate irradiated by ultraviolet light?

12. Atoms

Q.No.1: (i) Explain Bohr's quantisation condition on the basis of the wave picture of an electron.

(ii) What will be the frequency of a photon which can excite the electron to -3.4 eV from -13.6 eV?

Answer: (ii) 2. 47 × 10^15 Hz

Q.No.2: (i) Obtain Bohr's quantisation condition on the basis of the wave nature of an electron.

(ii) Calculate the period of revolution of an electron revolving in the second orbit of the hydrogen atom. Given radius of first orbit = 0.53 Angstrom.

Answer: (ii) 1. 216 × 10^−15 s

13. Nuclei

Q.No.1: Which force is stronger: Nuclear force or Electrostatic force within nuclear range? What is the role of nuclear force in the formation of a nucleus?

Q.No.2: What is the effect of mass number on the nuclear density? Explain.

Q.No.3: (i) Explain the term "saturation of nuclear forces".

(ii) Define isotopes. Name the other two isotopes of hydrogen.

14. Semiconductor Electronics: Materials, Devices and Simple Circuits

Q.No.1: What is a dopant? Name any two types of dopants used to form extrinsic Semiconductors?

Q.No.2: Mention any two differences between p-type and n-type semiconductors.

Q.No.3: How does a depletion region form in a p-n junction?