CBSE Class 12 Physics Question Paper(Memory Based)

Time Allowed :3 Hours	**Maximum Marks :**70	**Total questions :**37

General Instructions

Read the following instructions very carefully and strictly follow them:

1. Please check that this question paper contains 23 printed pages.
2. Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
3. Please check that this question paper contains 37 questions.
4. 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the candidates will read the question paper only and will not write any answer on the answer-book during this period.

1. In a Young's double-slit experiment, the fringe width is found to be β. If the entire apparatus is immersed in a liquid of refractive index μ, the new fringe width will be:

(A) β

(B) $\mu\beta$

(C) $\frac{\beta}{\mu}$

(D) $\frac{\beta}{\mu^2}$

---

2. A light of frequency ν is incident on a metal surface whose work function is W_0. The kinetic energy of emitted electron is K. If the frequency of the incident light is doubled, then the kinetic energy of emitted electron will be:

(A) $2K$

(B) more than $2K$

(C) between K and $2K$

(D) less than K

---

3. Which of the following statements is not true for nuclear forces?

(A) They are stronger than Coulomb forces.

(B) They have about the same magnitude for different pairs of nucleons.

(C) They are always attractive.

(D) They saturate as the separation between two nucleons increases.

---

4. A particle of mass m and charge $-q$ is moving with a uniform speed v in a circle of radius r, with another charge q at the centre of the circle. The value of r is:

(A) $\dfrac{1}{4\pi\varepsilon_0 m}\left(\dfrac{q}{v}\right)$

(B) $\dfrac{1}{4\pi\varepsilon_0 m}\left(\dfrac{q}{v}\right)^2$

(C) $\dfrac{m}{4\pi\varepsilon_0}\left(\dfrac{q}{v}\right)$

(D) $\dfrac{m}{4\pi\varepsilon_0}\left(\dfrac{q}{v}\right)^2$

---

5. Photons of energy $3.2\,$eV are incident on a photosensitive surface. If the stopping potential for the emitted electrons is $1.5\,$V, the work function for the surface is:

(A) $1.5\,$eV

(B) $1.7\,$eV

(C) $3.2\,$eV

(D) $4.7\,$eV

---

6. Which one of the following has relative magnetic permeability between 0 and 1?

(A) Aluminium

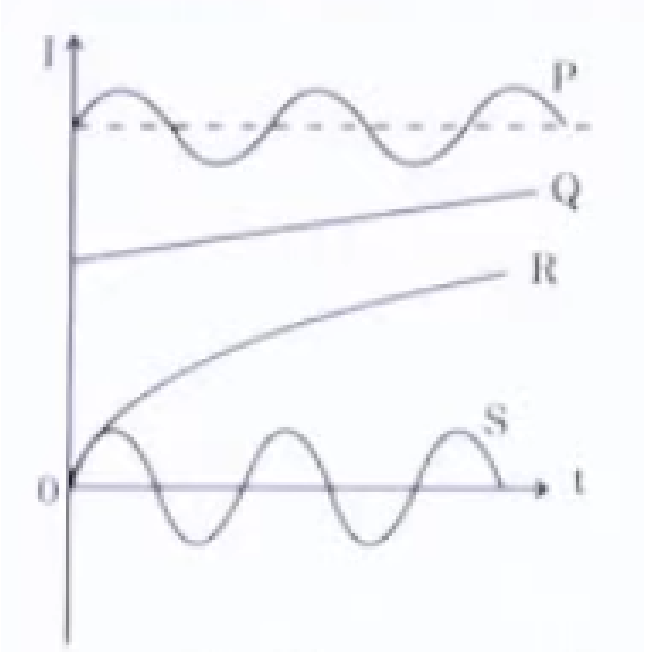
(B) Alnico

(C) Water

(D) Sodium

---

7. The figure shows variation of current (I) with time (t) in four devices P, Q, R, and S. The device in which an alternating current flows is:



(A) P

(B) Q

(C) R

(D) S

---

8. Name the electromagnetic waves also known as 'heat waves'.

(A) Radio waves

(B) Microwaves

(C) X-rays

(D) Infrared waves

---

9. A plane wavefront is incident on a concave mirror of radius of curvature R. The radius of the reflected wavefront will be:

(A) $2R$

(B) R

(C) $\frac{R}{2}$

(D) $\frac{R}{4}$

10. A proton and an alpha particle have the same kinetic energy. The ratio of de Broglie wavelengths associated with the proton to that with the alpha particle is:

(A) 1

(B) 2

(C) $2\sqrt{2}$

(D) $\frac{1}{2}$

---

11. State the law and derive the electric field due to an infinitely long straight charged wire.

---

12. Derive the electric field at axial and equatorial points of an electric dipole.

---

13. Derive the relation between current and drift velocity $(I = nAev_d)$**.**

---

14. State the principle of Wheatstone bridge and derive the balancing condition.

---

15. Derive the expression for the force per unit length between two parallel current-carrying wires.

---

16. State the laws of electromagnetic induction.

---

17. Explain the working of a step-up/step-down transformer and causes of energy loss.

---

18. State Einstein's photoelectric equation and its significance.
