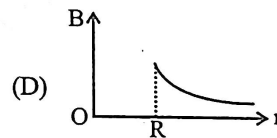
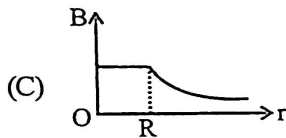
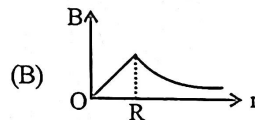
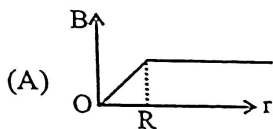


CBSE Class 12 Physics Exam 2025-26

Sample Practice Test - 1

SECTION-A

1. A charge Q is enclosed by a Gaussian spherical surface of radius R . If the radius is doubled, then the outward electric flux will
 - (A) increase four times
 - (B) be reduced to half
 - (C) remain the same
 - (D) be doubled
2. A magnet is moved towards a coil (i) quickly (ii) slowly, then the induced e.m.f. is
 - (A) larger in case (i)
 - (B) smaller in case (i)
 - (C) equal in both the cases
 - (D) larger or smaller depending upon the radius of the coil
3. If the susceptibility of dia, para and ferromagnetic materials are χ_d, χ_p, χ_f respectively, then
 - (A) $\chi_d < \chi_p < \chi_f$
 - (B) $\chi_d < \chi_f < \chi_p$
 - (C) $\chi_f < \chi_d < \chi_p$
 - (D) $\chi_f < \chi_p < \chi_d$
4. An infinitely long hollow conducting cylinder with radius R carries a uniform current along its surface. Choose the correct representation of magnetic field (B) as a function of radial distance (r) from the axis of cylinder.



5. A current carrying conductor placed in a magnetic field experiences maximum force when angle between current and magnetic field is
 - (A) $3\pi/4$
 - (B) $\pi/2$
 - (C) $\pi/4$
 - (D) zero
6. Select the wrong statement. EM waves
 - (A) are transverse in nature.
 - (B) travel in free space at a speed of light.
 - (C) are produced by accelerating charges.
 - (D) travel in all media with same speed.
7. Match the Column-I and Column-II

Column I

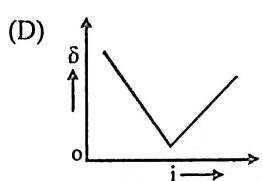
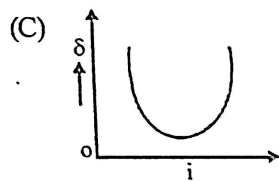
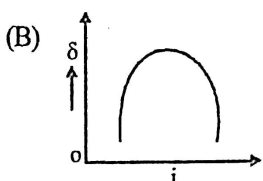
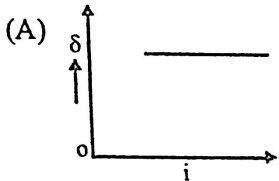
- (P) An object is placed at focus of a convex mirror
 (Q) An object is placed at centre of curvature before a concave mirror
 (R) An object is placed at focus before a concave mirror
 (S) An object is placed at centre of curvature before a convex mirror

Column II

- (1) Magnification is $-\infty$
 (2) Magnification is 0.5
 (3) Magnification is +1
 (4) Magnification is -1
 (5) Magnification is 0.33

- (A) (P) \rightarrow (2); (Q) \rightarrow (3); (R) \rightarrow (4); (S) \rightarrow (5)
 (B) (P) \rightarrow (5); (Q) \rightarrow (4); (R) \rightarrow (3); (S) \rightarrow (1)
 (C) (P) \rightarrow (2); (Q) \rightarrow (4); (R) \rightarrow (1); (S) \rightarrow (5)
 (D) (P) \rightarrow (3); (Q) \rightarrow (5); (R) \rightarrow (2); (S) \rightarrow (4)

8. The graph between angle of deviation (δ) and angle of incidence (i) for a triangular prism is represented by



9. If the kinetic energy of a free electron doubles, its de-Broglie wavelength changes by the factor

- (A) 2
- (B) $\frac{1}{2}$
- (C) $\sqrt{2}$
- (D) $\frac{1}{\sqrt{2}}$

10. In terms of Bohr radius r_0 , the radius of the second Bohr orbit of a hydrogen atom is given by

- (A) $4 r_0$
- (B) $8 r_0$
- (C) $\sqrt{2} r_0$
- (D) $2 r_0$

11. M_p denotes the mass of a proton and M_n that of a neutron. A given nucleus, of binding energy B , contains Z protons and N neutrons. The mass $M(N, Z)$ of the nucleus is given by (c is the velocity of light)

- (A) $M(N, Z) = NM_n + ZM_p + B/c^2$
- (B) $M(N, Z) = NM_n + ZM_p - Bc^2$
- (C) $M(N, Z) = NM_n + ZM_p + Bc^2$
- (D) $M(N, Z) = NM_n + ZM_p - B/c^2$

12. If a small amount of antimony is added to germanium crystal

- (A) it becomes a p -type semiconductor
- (B) the antimony becomes an acceptor atom
- (C) there will be more free electrons than holes in the semiconductor
- (D) its resistance is increased

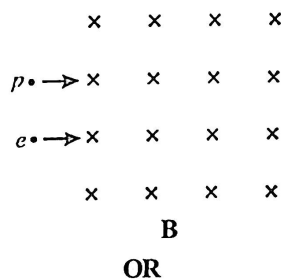
For question numbers 13 to 16, two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

- (A) If both A and R are true and R is the correct explanation of A
- (B) If both A and R are true but R is NOT the correct explanation of A
- (C) If A is true but R is false
- (D) Both are false

13. **Assertion (A)** : Electric potential and electric potential energy are different quantities.
Reason (R) : For a system of positive test charge and point charge electric potential energy = electric potential.
14. **Assertion (A)** : Interference pattern is made by using yellow light instead of red light, the fringes become narrower.
Reason (R) : In YDSE, fringe width is given by $\beta = \frac{D\lambda}{d}$ and $\lambda_y < \lambda_R$
15. **Assertion (A)** : The velocity of electromagnetic waves depends on electric and magnetic properties of the medium.
Reason (R) : Velocity of electromagnetic waves in free space is constant.
16. **Assertion (A)** : I-V characteristic of p-n junction diode is same as that of other conductor
Reason (R) : p-n junction diode behaves as conductor at room temperature.

SECTION-B

17. Answer the following question :
- (I) In what way is diffraction from each slit related to the interference pattern in a double slit experiment?
 (II) When a tiny circular obstacle is placed in the path of light from a distant source, a bright spot is seen at the centre of the shadow of the obstacle. Explain, why?
18. An electric dipole is held in a uniform electric field.
 (I) Show that no translatory force acts on it.
 (II) Derive an expression for the torque acting on it.
19. An electron and a proton moving with the same speed enter the same magnetic field region at right angles to the direction of the field. Show the trajectory followed by the two particles in the magnetic field. Find the ratio of the radii of the circular paths which the particles may describe.



A proton is accelerated through a potential difference V , subjected to a uniform magnetic field acting normal to the velocity of the proton. If the potential difference is doubled, how will the radius of circular path described by the proton in the magnetic field change?

20. How is p-n junction formed? Explain.
21. Draw the ray diagram showing the formation of image of an object by the compound microscope.

OR

Explain with the help of lens maker's formula. Why does a convex lens behave as -

- (I) Converging when immersed in water ($\mu = 1.33$) and
 (II) A diverging lens when immersed in CS_2 solution ($\mu = 1.6$).

SECTION-C

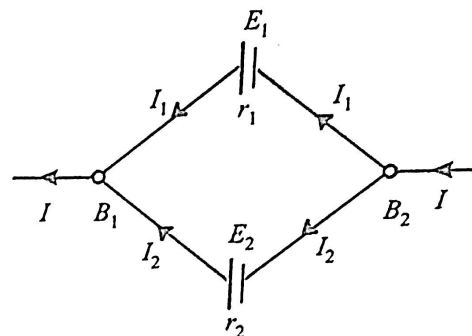
- (A) Define the current sensitivity of a galvanometer.
- (B) The coil area of a galvanometer is $25 \times 10^{-4} \text{ m}^2$. It consists of 150 turns of a wire and is in a magnetic field of 0.15 T. The restoring torque constant of the suspension fibre is $10^{-6} \text{ N m per degree}$. Assuming the magnetic field to be radial, calculate the maximum current that can be measured by the galvanometer, if the scale can accommodate 30° deflection.

OR

State Biot-Savart law and give the mathematical expression for it.

How does a circular loop carrying current behave as a magnet?

23. Two cells of emf E_1 and E_2 having internal resistances r_1 and r_2 respectively are connected in parallel as shown. Deduce the expressions for the equivalent emf and equivalent internal resistance of a cell which can replace the combination between the points B_1 and B_2 .



24. A 12.9 eV beam of electronic is used to bombard gaseous hydrogen at room temperature. Upto which energy level the hydrogen atoms would be excited ?
25. Sketch the graphs showing variation of stopping potential with frequency of incident radiations for two photosensitive materials A and B having threshold frequencies $\nu_A > \nu_B$.
- (I) In which case is the stopping potential more and why ?
- (II) Does the slope of the graph depend on the nature of the material used ? Explain.
26. The radius of nucleus of nucleon number 16 is $3 \times 10^{-15} \text{ cm}$. Calculate the radius of nucleus of nucleon number 205.
27. Write the two processes that take place in the formation of a p-n junction. Explain with the help of a diagram, the formation of depletion region and barrier potential in a p-n junction.
28. Define self-inductance of a coil. Obtain the expression for the energy stored in an inductor L connected across a source of emf.

SECTION-D

29. Read the following paragraph and answer the questions.

Electrostatic potential at a point in an electric field is *the minimum work done by an external agent in moving a unit positive charge from infinity or a reference point to that point against the electrical force of the field.*

An equipotential surface is that at every point of which electric potential is same.

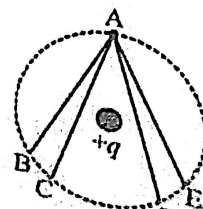
Relation between Electric field (E) and potential (v) is

$$E = \frac{-dv}{dr}$$

Here dr is the path length

- (I) In the electric field of a point charge q , a certain charge is carried from point A to B, C, D and E. Then the work done is

- (A) least along the path AB
 (B) least along the path AD
 (C) zero along all the paths AB, AC, AD and AE
 (D) least along AE



- (II) From a point charge, there is a fixed point A. At A, there is an electric field of 500 V/m and potential difference of 3000 V. Distance between point charge and A will be
- (A) 6m (B) 12m
(C) 16m (D) 24m
- (III) The electric potential at a point (x, y) in the x - y plane is given by $V = -kxy$. The field intensity at a distance r from the origin varies as
- (A) r^2 (B) r
(C) $\frac{1}{r}$ (D) $\frac{1}{r^2}$
- (IV) If a unit positive charge is taken from one point to another over an equipotential surface, then
- (A) work is done on the charge (B) work is done by the charge
(C) work done is constant (D) no work is done

30. Read the following paragraph and answer the questions.

When two coherent sources interact with each other, there will be production of alternate bright and dark fringes on the screen. Young's double-slit experiment demonstrates the idea of making two coherent sources. For better visibility, one has to choose proper amplitude for the sources. The phenomena is good enough to satisfy the conservation of energy principle. The pattern formed in YDSE is of uniform thickness and is nicely placed on a long distance screen.

If two waves of intensity I_1 and I_2 and phase difference ϕ between them, resultant intensity is given by

$$I = I_1 + I_2 + 2\sqrt{I_1 I_2} \cos \phi$$

- (I) Two coherent monochromatic light beams of intensities I and 4I are superposed. Find the maximum and minimum possible intensities in the resulting beam
- (II) The path difference between two interfering waves at a point on screen is 171.5 times the wavelength. If the path difference is 0.01029 cm. Find the wavelength.
- (III) Two beams of light of intensity I_1 and I_2 interfere to give an interference pattern. If the ratio of maximum intensity to that of minimum intensity is 25/9, then find I_1/I_2

SECTION-E

31. (I) Show that the effective capacitance, C of a series combination of three capacitors C_1 , C_2 and C_3 is given by

$$C = \frac{C_1 C_2 C_3}{C_1 C_2 + C_2 C_3 + C_3 C_1}$$

- (II) A parallel plate capacitor with air has a capacitance of 10 pF. If the distance between the plates is reduced to half and the space between them is filled with a material of dielectric constant 10, find the new capacitance.

OR

- (III) A parallel plate capacitor is charged by a battery to a potential. The battery is disconnected and a dielectric slab is inserted to completely fill the space between the plates. How will

- (A) its capacitance,
(B) electric field between the plates and

- (II) Sketch the pattern of electric field lines due to
- (A) a conducting sphere having negative charge on it.
 - (B) an electric dipole.

32. Show diagrammatically two different arrangements used for winding the primary and secondary coils in a transformer. Assuming the transformer to be an ideal one, write expression for the ratio of it's.

- (I) Output voltage to input voltage.
- (II) Output current to input current.

Mention the reasons for energy losses in an actual transformer.

OR

What is impedance? Give its SI unit. Using the phasor diagram or otherwise derive an expression for the impedance of an a.c. circuit containing L, C and R in series. Find the expression for resonant frequency.

33. (A) When a tiny circular obstacle is placed in the path of light from a distant source, a bright spot is seen at the centre of the obstacle. Explain why?

(B) Show that the angular width of the first diffraction fringe is half that of the central fringe.

(C) Explain why the maxima at $\theta = \left(n + \frac{1}{2}\right) \frac{\lambda}{a}$ become weaker and weaker with increasing n.

OR

Define the term wavefront. State Huygen's principle.

Consider a plane wavefront incident on a thin convex lens. Draw a proper diagram to show how the incident wavefront traverses through the lens and after refraction focusses on the focal point of the lens, giving the shape of the emergent wavefront.