

O P JINDAL SCHOOL, SAVITRINAGAR

CLASS TEST & PRACTICE

ANSWER KEY

CLASS XII PHYSICS

TOPIC : MOVING CHARGES AND MAGNETISM

- 1 Which has greater resistance (a) milliammeter or ammeter (b) milliammeter or voltmeter? 1

ANS: (a) Milliammeter
(b) Voltmeter

- 2 A voltmeter, an ammeter and a resistance are connected in series with a battery. The voltmeter gives same deflection but the deflection of ammeter is almost zero. Explain why? 1

ANS: When a voltmeter is connected in series, the current in the circuit decreases because the resistance of voltmeter is high. Therefore, it will show some deflection. But in an ammeter, the majority of this current will pass through the shunt and a very small fraction will pass through the galvanometer.

- 3 State the law used to determine the direction of magnetic field at the centre of current carrying circular coil. 1

ANS: The right-hand thumb rule gives the direction of magnetic field which is stated as under:

Curl the palm of your right hand around a circular wire with the fingers, pointing in the direction of the current and the right hand thumb gives the direction of magnetic field.

- 4 A narrow beam of protons and deuterons, each having the same momentum, enters a region of uniform magnetic field directed perpendicular to their direction of momentum. What would be the ratio of the radii of the circular paths described by them? 1

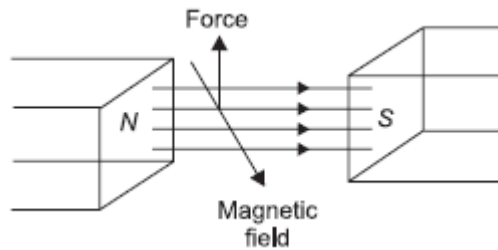
$$\begin{aligned} \therefore qvB &= \frac{mv^2}{r} \Rightarrow r = \frac{mv}{qB} \\ \therefore \frac{r_p}{r_D} &= \frac{q_D}{q_p} = \frac{1}{1} \Rightarrow r_p : r_D = 1 : 1 \end{aligned}$$

ANS:

- 5 Write two properties of a material used as a suspension wire in a moving coil galvanometer. 1

ANS: (i) Low value of k (torsional constant), (ii) High conductivity.

- 6 A charged particle enters into a uniform magnetic field and experiences an upward force as indicated in the figure. What is the charge sign on the particle? 1



ANS: $\because \vec{F} = q(\vec{v} \times \vec{B})$ and using Fleming's-left hand rule, the electric charge is positive.

- 7 How does the magnetic moment of an electron in a circular orbit of radius r and moving with a speed v change, when the frequency of revolution is doubled? 1

ANS: As $M \propto v$, the magnetic moment also gets doubled, when the frequency of revolution is doubled.

- 8 A current carrying loop is free to turn in a uniform magnetic field B . Under what conditions, will the torque acting on it be (i) minimum and (ii) maximum? 1

ANS: $t = MB \sin \theta$

(i) Torque is minimum when the area vector of the loop and the magnetic field vector are in the same direction, i.e. $\vec{A} \parallel \vec{B}$.

(ii) Torque is maximum when $\vec{A} \perp \vec{B}$.

- 9 Write two factors by which voltage sensitivity of a galvanometer can be increased. 1

ANS: As we know that $V_s = \left(\frac{NAB}{k}\right) \frac{1}{R}$ Thus, (i) Resistance should be less.
(ii) Torsional constant should be less.

- 10 An ammeter and a milliammeter are converted from the same galvanometer. Out of the two, which current measuring instrument has higher resistance? 1

ANS: The higher is the range, the lower will be the value of shunt, so a milliammeter will be having higher resistance.