Moving Charges And Magnetism

Q.No.1:
A circular loop of radius 0.3 cm lies parallel to a much bigger circular loop of radius 20 cm. The centre of the small loop is on the axis of the bigger loop. The distance between their centres is 15 cm. If a current of 2.0 A flows through the smaller loop, then the flux linked with bigger loop is:

JEE 2013

A. 9.1×10^{-11} weber

B. 6×10^{-11} weber

C. 3.3×10^{-11} weber

D. 6.6×10^{-9} weber

Q.No.2:
This question has Statement I and Statement II. Of the four choices given after the Statements, choose the one that best describes the two Statements.
Statement – I: Higher the range, greater is the resistance of ammeter.
Statement – II: To increase the range of ammeter, additional shunt needs to be used across it.

JEE 2013

A. Statement – I is true, Statement – II is true, Statement – II is the **correct** explanation of statement – I

B. Statement – I is true, Statement – II is true, Statement – II is **not** the correct explanation of Statement – I.

C. Statement – I is true, Statement – II is false.

D. Statement – I is false, Statement – II is true.

Q.No.3: When a current of 5 mA is passed through a galvanometer having a coil of resistance 15 Ω, it shows full scale defection. The value of the resistance to be put in series with the galvanometer to convert it into a voltmeter of range 0 – 10 V is: **JEE 2017**

A. $4.005 \times 10^3\ \Omega$

B. $1.985 \times 10^3\ \Omega$

C. $2.045 \times 10^3\ \Omega$
D. $2.535 \times 10^3\ \Omega$

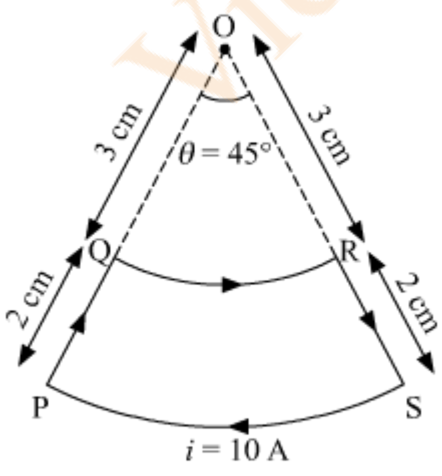
Q.No.4: An electron, a proton and an alpha particle having the same kinetic energy are moving in circular orbits of radii r_e, r_p, r_α respectively in a uniform magnetic field B. The relation between r_e, r_p, r_α is : **JEE 2018**

A. $r_e < r_p < r_\alpha$
B. $r_e < r_\alpha < r_p$
C. $r_e > r_p = r_\alpha$
D. $r_e < r_p = r_\alpha$

Q.No.5: The dipole moment of a circular loop carrying a current I is m and the magnetic field at the center of the loop is B_1. When the dipole moment is doubled keeping the current constant, the magnetic field at the center of the loop is B_2. The ratio $\frac{B_1}{B_2}$ is : **JEE 2018**

A. $\sqrt{2}$
B. $\frac{1}{\sqrt{2}}$
C. 3
D. $\sqrt{3}$

Q.No.6: A current loop, having two circular arcs joined by two radial lines is shown in the figure. It carries a current of 10 A. The magnetic field at point O will be close to: **JEE 2019**



A. 1.0×10^{-7} T
B. 1.5×10^{-7} T

C. 1.5×10^{-5} T

D. 1.0×10^{-5} T

Q.No.7: A conducting circular loop made of a thin wire, has area 3.5×10^{-3} m^2 and resistance 10 Ω. It is placed perpendicular to a time dependent magnetic field B(t) = (0.4T) sin (50πt). The field is uniform in space. Then the net charge flowing through the loop during t = 0 s and t = 10 ms is close to: **JEE 2019**

A. 14 mC

B. 7 mC

C. 21 mC

D. 6 mC

Q.No.8: A particle having the same charge as of electron moves in a circular path of radius 0.5 cm under the influence of a magnetic field of 0.5 T. If an electric field of 100 V/m makes it to move in a straight path, then the mass of the particle is (Given charge of electron = 1.6×10^{-19} C) **JEE 2019**

A. 9.1×10^{-31} kg

B. 1.6×10^{-27} kg

C. 1.6×10^{-19} kg

D. 2.0×10^{-24} kg

Q.No.9: One of the two identical conducting wires of length L is bent in the form of a circular loop and the other one into a circular coil of N identical turns. If the same current is passed in both, the ratio of the magnetic field at the centre of the loop (B_L) to that at the center of the coil (B_C), i.e. $\frac{B_L}{B_C}$ will be: **JEE 2019**

A. N

B. $\frac{1}{N}$

C. N^2

D. $\frac{1}{N^2}$

Q.No.10: A magnet of total magnetic moment $10^{-2}\ \hat{i}\ A - m^2$ is placed in a time varying magnetic field, $B\hat{i}\ (\cos \omega t)$ where B = 1 Tesla and ω = 0.125 rad/s. The work done for reversing the direction of the magnetic moment at t =

1 second, is:

A. 0.01 J

B. 0.007 J

C. 0.028 J

D. 0.014 J