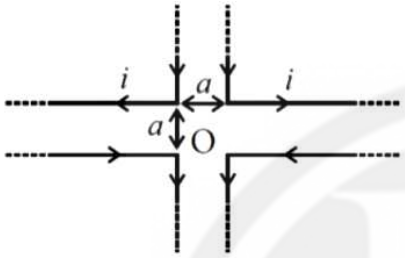
Prayas JEE (2025)

Physics

Magnetism

DPP: 7

Q1 Four infinitely long L shaped wires, each carrying a current I have been arranged as shown in the figure, Obtain the magnetic field intensity at the point O equidistant from all the four corners.



(A) $1\mathrm{wb}/\mathrm{m}^2$

(B) $0\mathrm{wb}/\mathrm{m}^2$

(C) $2\mathrm{wb}/\mathrm{m}^2$

(D) none of these

Q2 If number of turn, area and current through the coil is given by n, A and i respectively then its magnetic moment will be

(A) $ni\ \mathrm{A}$

(B) n^2iA

(C) niA^2

(D) $\frac{ni}{\sqrt{A}}$

Q3 A wire of length L metre carrying a current of I ampere is bent in the form of a circle. Its magnitude of magnetic moment will be

(A) $\frac{IL}{4\pi}$

(B) $\frac{IL^2}{4\pi}$

(C) $\frac{I^2L^2}{4\pi}$

(D) $\frac{I^2L}{4\pi}$

Q4 A magnet of magnetic moment $50\hat{i}\ \mathrm{A}-\mathrm{m}^2$ is placed along the x-axis in a magnetic field $\vec{B}=(0.5\hat{i}+3.0\hat{j})\mathrm{T}$. The torque acting on the magnet is

(A) $175\hat{k}\ \mathrm{N}-\mathrm{m}$

(B) $150\hat{k}\ \mathrm{N}-\mathrm{m}$

(C) $75\hat{k}\ \mathrm{N}-\mathrm{m}$

(D) $25\sqrt{37}\hat{k}\ \mathrm{N}-\mathrm{m}$

Q5 A conducting circular loop of radius r carries a constant current i. It is placed in a uniform magnetic field $\vec{B}$ such that $\vec{B}$ is perpendicular to the plane of the loop. The magnetic force acting on the loop is

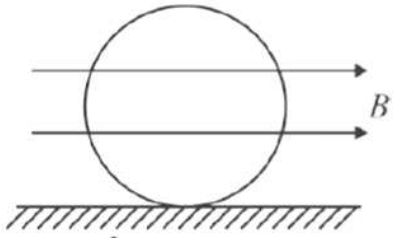
(A) $\rightarrow$ ir B

(B) $2\pi\mathrm{riB}$

(C) Zero

(D) $\rightarrow$ $\pi\mathrm{riB}$

Q6 A conducting ring of mass $2\ \mathrm{kg}$ and radius $0.5\ \mathrm{m}$ is placed on a smooth horizontal plane. The ring carries a current of $i=4\ \mathrm{A}$. A horizontal magnetic field $B=10T$ is switched on at time $t=0$ as shown in Fig. The initial angular acceleration of the ring will be



(A) $40\pi \text{ rad s}^{-2}$

(B) $20\pi \text{ rad s}^{-2}$

(C) $5\pi \text{ rad s}^{-2}$

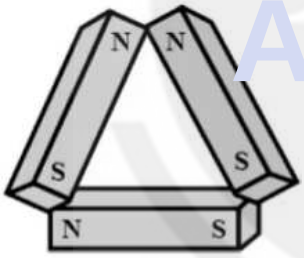
(D) $15\pi \text{ rad s}^{-2}$

Q7 A magnet of magnetic moment M and pole strength m is divided in two equal parts, then magnetic moment of each part will be

(A) M (B) $M/2$

(C) $M/4$ (D) $2M$

Q8 Three identical bar magnets each of magnetic moment M are placed in the form of an equilateral triangle as shown.



The net magnetic moment of the system is

(A) Zero

(B) $2M$

(C) $M\sqrt{3}$

(D) $3M/2$

Q9 A bar magnet when placed at an angle of 30° to the direction of magnetic field induction of $5 \times 10^{-2}\ \mathrm{T}$, experiences a moment of couple $25 \times 10^{-6}\ \mathrm{N-m}$. If the length of the magnet is $5\ \mathrm{cm}$ its pole strength is

(A) $2 \times 10^{-2}\ \mathrm{A-m}$

(B) $5 \times 10^{-2}\ \mathrm{A-m}$

(C) $2\ \mathrm{A-m}$

(D) $5\ \mathrm{A-m}$

Answer Key

Q1	B
Q2	A
Q3	B
Q4	B
Q5	C
Q6	A
Q7	B
Q8	B
Q9	A

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