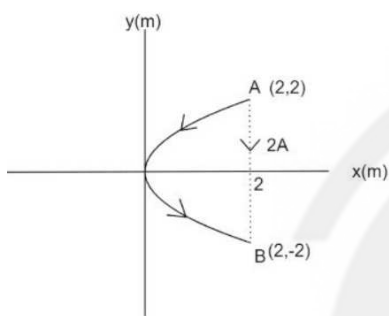


Prayas JEE (2025)

Physics Magnetism

DPP: 6

Q1 A conducting wire bent in the form of a parabola $y^2 = 2x$ carries a current $i = 2A$ as shown in figure. This wire is placed in a uniform magnetic field $\vec{B} = -4\hat{k}$ Tesla. The magnetic force on the wire is (in newton)



- (A) $-16\hat{i}$
- (B) $32\hat{i}$
- (C) $-32\hat{i}$
- (D) $16\hat{i}$

Q2 A circular coil of 20 turns and radius 10 cm is placed in uniform magnetic field of 0.10 T normal to the plane of the coil. If the current in coil is 5 A, then the torque acting on the coil will be

- (A) 31.4Nm
- (B) 3.14Nm
- (C) 0.314Nm
- (D) zero

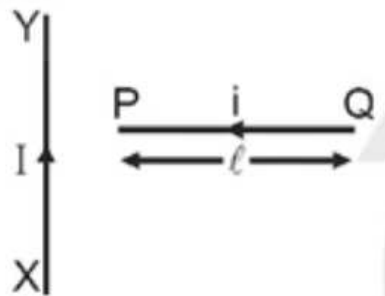
Q3 A charge q moves in a region where electric field and magnetic field both exist, then force on it

- (A) $q(\vec{v} \times \vec{B})$
- (B) $q\vec{E} + q(\vec{v} \times \vec{B})$
- (C) $q\vec{E} + q(\vec{B} \times \vec{v})$
- (D) $q\vec{B} + q(\vec{E} \times \vec{v})$

Q4 An electric field \vec{E} and a magnetic field \vec{B} applied on a proton which moves with velocity \vec{v} , it goes undeflected through the region if

- (A) \vec{E} is parallel to \vec{B} .
- (B) \vec{E} is parallel to \vec{v} and perpendicular to \vec{B}
- (C) \vec{E} , \vec{B} and \vec{v} all three mutually perpendicular to each other and $v = E/B$
- (D) \vec{E} and \vec{B} both are parallel but perpendicular to \vec{v}

Q5 A wire PQ carries a current i is placed perpendicular to a long wire XY carrying a current I . The direction of force on PQ will be



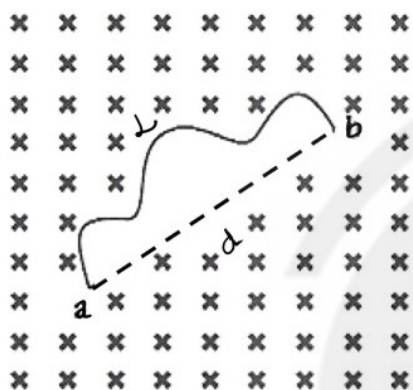
- (A) Towards right
- (B) Towards left
- (C) Upwards
- (D) Downwards

Q6 Two parallel wires in free space are 10 cm apart and each carries a current of 10 A in the same direction. The magnetic force per unit length of each wire is



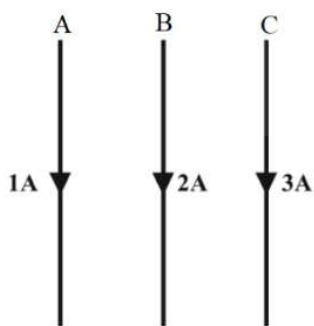
- (A) 2×10^{-4} N, attractive
- (B) 2×10^{-4} N, repulsive
- (C) 2×10^{-7} N, attractive
- (D) 2×10^{-7} N, repulsive

Q7 Figure shows a wire of arbitrary shape carrying a current I between points a and b . The length of the wire is L and the distance between points a and b is d . The wire lies in a plane at right angle to a uniform magnetic field B . Then the force on the wire is:



- (A) ILB
- (B) IdB
- (C) $I(L - d)B$
- (D) none of these

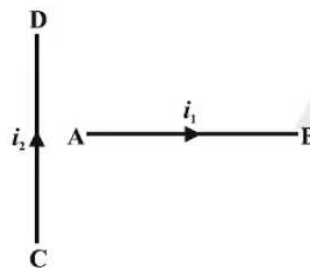
Q8 Three infinite straight wires A , B and C carry currents as shown. The net force on the wire B is directed



- (A) towards A
- (B) towards C
- (C) normal to plane of paper
- (D) zero

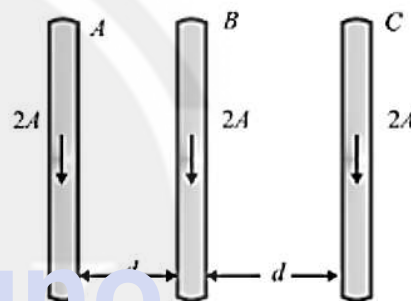
Q9 A current i_1 carrying wire AB is placed near another long wire CD carrying current i_2

as shown in figure. If free to move, wire AB will have



- (A) rotational motion only
- (B) translational motion only
- (C) rotational as well as translational motion
- (D) neither rotational nor translational motion

Q10 Three long straight wires A , B and C are carrying currents as shown figure. Then the resultant force on B is directed



- (A) Towards A
- (B) Net force on B is zero
- (C) Perpendicular to the plane of paper and outward
- (D) Perpendicular to the plane of paper and inward

Q11 A wire of length ℓ carries a current i along the X - axis. A magnetic field exists which is given as $\vec{B} = B_0(\hat{i} + \hat{j} + \hat{k})T$. The magnitude of the magnetic force acting on the wire

- (A) ilB_0
- (B) $3ilB_0$
- (C) $\sqrt{2}ilB_0$
- (D) $\sqrt{3}ilB_0$



Answer Key

Q1 B
Q2 D
Q3 B
Q4 C
Q5 D
Q6 A

Q7 B
Q8 B
Q9 C
Q10 B
Q11 C



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