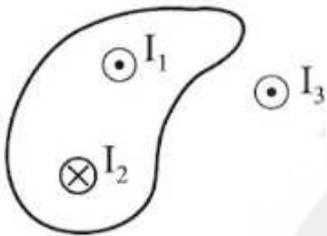


Physics JEE (2025)

Physics Magnetism

DPP: 3

Q1 $\rightarrow \rightarrow \rightarrow$
 B_1, B_2 and B_3 are the magnetic field due to I_1, I_2 and I_3 . Amperes circuital law is given by $\oint \vec{B} \cdot d\vec{l} = \mu_0 I$, here \vec{B} is

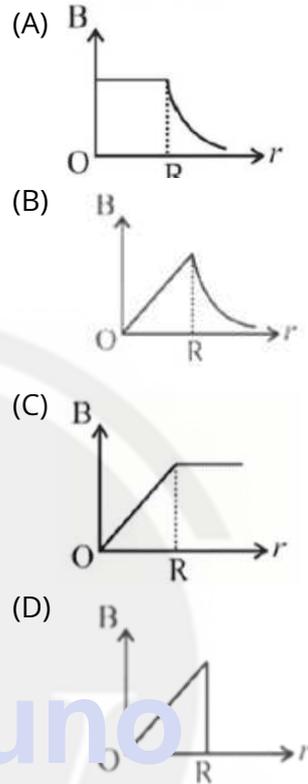


- (A) $\rightarrow \rightarrow \rightarrow$
 $B = B_1 - B_2$
- (B) $\rightarrow \rightarrow \rightarrow \rightarrow$
 $B = B_1 + B_2 + B_3$
- (C) $\rightarrow \rightarrow \rightarrow \rightarrow$
 $B = B_1 + B_2 - B_3$
- (D) $\rightarrow \rightarrow \rightarrow$
 $B = B_1 - B_3$

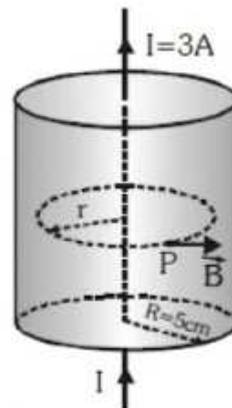
Q2 A closed curve encircles several conductors. The line integral $\int \vec{B} \cdot d\vec{l}$ around this curve is $3.83 \times 10^{-7} \text{ T} \cdot \text{m}$. What is the net current in the conductors?

- (A) 0.1 A
- (B) 0.2 A
- (C) 0.3 A
- (D) 0.4 A

Q3 The correct plot of the magnitude of magnetic field B vs distance r from centre of the wire is, if the radius of wire is R



Q4 A long straight conductor of radius 5 cm carries a current of 3 A, which is uniformly distributed over its circular cross-section. Find the magnetic field induction at a distance 4 cm from the axis of the conductor (Relative permeability of the conductor = 1000).



- (A) $9.6 \times 10^{-2} \text{ T}$.



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- (B) $9.6 \times 10^{-3} T$
- (C) $8.6 \times 10^{-3} T$
- (D) $5.6 \times 10^{-3} T$

Q5 A solid cylindrical wire of radius R carries a current I . The ratio of magnetic fields at points which are located at $R/2$ and $2R$ distance away from the axis of the wire.

(A) 1 : 1 (B) 1 : 2
 (C) 2 : 1 (D) 1 : 4

Q6 A hollow cylindrical wire carries a current I , having inner and outer radii R and $2R$ respectively. Magnetic field at a point which $3R/2$ distance away from its axis is.

(A) $\frac{5\mu_0 I}{18\pi R}$
 (B) $\frac{\mu_0 I}{36\pi R}$
 (C) $\frac{5\mu_0 I}{36\pi R}$
 (D) $\frac{5\mu_0 I}{9\pi R}$

Q7 Mean radius of a toroid is 10 cm and number of turns are 500. If current flowing through it is 0.1 ampere then value of magnetic field (in tesla) for toroid:-

(A) 10^{-2} (B) 10^{-5}
 (C) 10^{-3} (D) 10^{-4}

Q8 A long solenoid carrying a current produced a magnetic field B along its axis. If the current is doubled and the number of turns per cm is halved, the new value of the magnetic field is.

(A) $B/2$
 (B) B
 (C) $2B$
 (D) $4B$

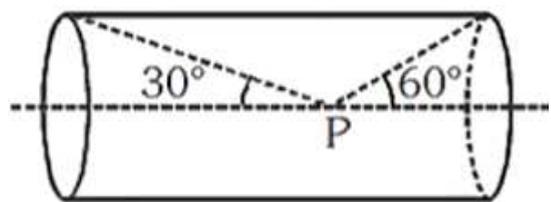
Q9 A long solenoid having 200 turns /cm and carries current i . Magnetic field at its axis is $6.28 \times 10^{-2} \text{ wb/m}^2$. Another solenoid having 100 turns /cm and carries $\frac{i}{3}$ current, then magnetic field at its axis will be-

(A) $1.05 \times 10^{-4} \text{ Wb/m}^2$
 (B) $1.05 \times 10^{-2} \text{ Wb/m}^2$
 (C) $1.05 \times 10^{-5} \text{ Wb/m}^2$
 (D) $1.05 \times 10^{-3} \text{ Wb/m}^2$

Q10 Consider a co-axial cable which consists of an inner wire of radius a surrounded by an outer shell of inner and outer radii b and c respectively. The inner wire carries a current I and outer shell carries an equal and opposite current. The magnetic field at a distance x from the axis where $b < x < c$ is

(A) $\frac{\mu_0 I (c^2 - b^2)}{2\pi x (c^2 - a^2)}$
 (B) $\frac{\mu_0 I (c^2 - x^2)}{2\pi x (c^2 - a^2)}$
 (C) $\frac{\mu_0 I (c^2 - x^2)}{2\pi x (c^2 - b^2)}$
 (D) Zero

Q11 Find out magnetic field at axial point P of solenoid shown in figure (where turn density n and current through it is I)



- (A) $\frac{\mu_0 n I}{4} (\sqrt{3} + 1)$
- (B) $\frac{\mu_0 n I}{2} (\sqrt{3} + 1)$
- (C) $\frac{\mu_0 n I}{2} (\sqrt{3} + 2)$

$$(D) \frac{\mu_0 n I}{4} (\sqrt{3} + 2)$$



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Answer Key

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

Q7 D
Q8 B
Q9 B
Q10 C
Q11 A



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