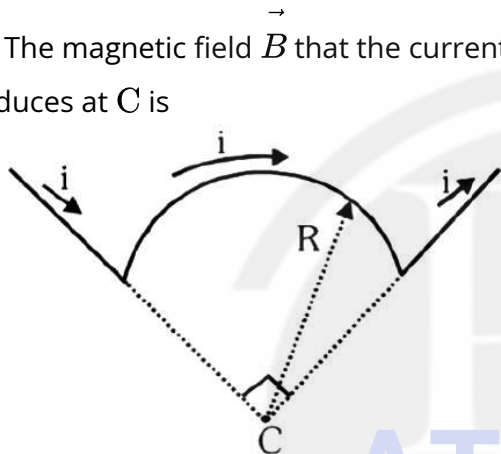


Prayas JEE (2025)

Physics Magnetism

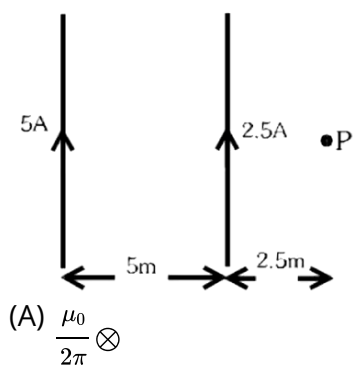
DPP: 2

Q1 The wire in the figure carries a current i and consists of a circular arc of radius R and central angle $\frac{\pi}{2}$ rad, and two straight sections whose extensions intersect the centre C of the arc. The magnetic field \vec{B} that the current produces at C is



- (A) $\vec{B} = \frac{\mu_0 i}{8R}$ into the plane of the figure
- (B) $\vec{B} = \frac{\mu_0 i}{8R}$ out of the plane of the figure
- (C) $\vec{B} = \frac{\mu_0 i}{8\pi R}$ into the plane of the figure
- (D) $\vec{B} = \frac{\mu_0 i}{8\pi R}$ out of the plane of the figure

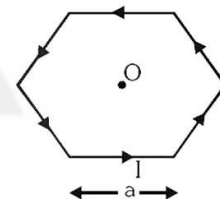
Q2 Magnetic field at point 'P' due to both infinite long current carrying wires is



- (A) $\frac{\mu_0}{2\pi} \otimes$

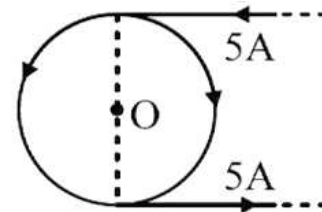
- (B) $\frac{5\mu_0}{6\pi} \otimes$
- (C) $\frac{5\mu_0}{6\pi} \odot$
- (D) $\frac{\mu_0}{2\pi} \odot$

Q3 Magnetic field at the centre of a regular hexagon, which is formed by current carrying wires



- (A) $\frac{6\mu_0 I}{\pi a}$
- (B) $\frac{\sqrt{3}\mu_0 I}{\pi a}$
- (C) $6\sqrt{3}\frac{\mu_0 I}{\pi a}$
- (D) $\frac{\mu_0 I}{\sqrt{3}\pi a}$

Q4 Magnetic field at point 'O' due to given current distribution. If 5 A current is flowing in this system and the diameter of the loop is 10 cm.

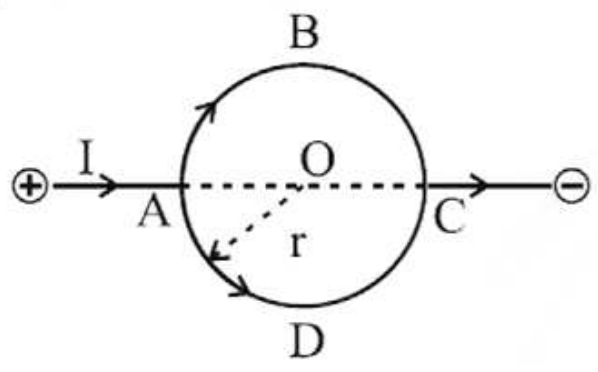


- (A) $2 \times 10^{-5} \text{ T}, \otimes$
- (B) $10^{-5} \text{ T}, \odot$
- (C) $10^{-5} \text{ T}, \otimes$
- (D) $2 \times 10^{-5} \text{ T}, \odot$



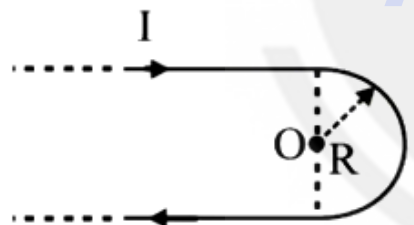
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Q5 Figure shows a circular loop with radius ' r '. The resistance of arc ABC is 5Ω and that of ADC is 10Ω . Magnetic field at the centre of the loop is



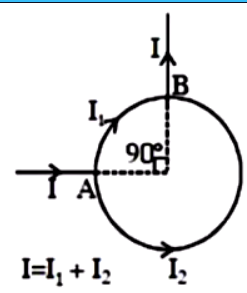
- (A) $\frac{\mu_0 I}{6r} \otimes$
- (B) $\frac{\mu_0 I}{12r} \otimes$
- (C) $\frac{\mu_0 I}{12r} \odot$
- (D) $\frac{\mu_0 I}{6r} \odot$

Q6 Find out magnetic field at point O for the following current distributions



- (A) $\frac{\mu_0 I}{2R} \left(\frac{1}{\pi} + \frac{1}{2} \right) \otimes$
- (B) $\frac{\mu_0 I}{5R} \left(\frac{1}{\pi} + \frac{1}{2} \right) \otimes$
- (C) $\frac{2R}{\mu_0 I} \left(\frac{1}{\pi} + \frac{1}{2} \right) \otimes$
- (D) $\frac{\mu_0 I}{3R} \left(\frac{1}{\pi} + \frac{1}{3} \right) \otimes$

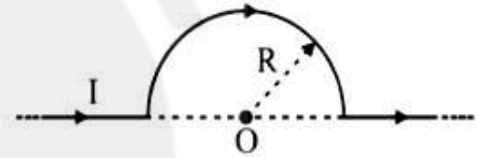
Q7 A current I enters a circular coil of radius R of uniform wire, branches into two parts and then recombines as shown in the circuit diagram



The resultant magnetic field at the centre of the coil is

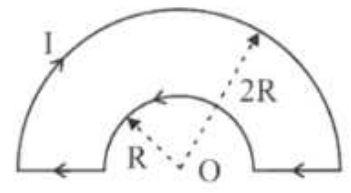
- (A) Zero
- (B) $\frac{\mu_0 I}{2R}$
- (C) $\frac{3}{4} \left(\frac{\mu_0 I}{2R} \right)$
- (D) $\frac{1}{4} \left(\frac{\mu_0 I}{2R} \right)$

Q8 Find out magnetic field at point O for the following current distributions.



- (A) $\frac{\mu_0 I}{4R} \odot$
- (B) $\frac{\mu_0 I}{6R} \otimes$
- (C) $\frac{\mu_0 I}{7R} \otimes$
- (D) $\frac{\mu_0 I}{5R} \otimes$

Q9 Find out magnetic field at point O for the following current distributions.

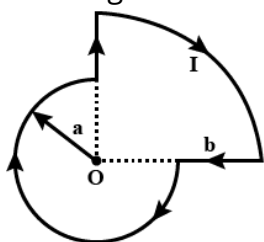


- (A) $\frac{\mu_0 I}{6R}$
- (B) $\frac{\mu_0 I}{8R}$
- (C) $\frac{\mu_0 I}{2R}$



(D) $\frac{\mu_0 I}{4R}$

Q10 The magnetic induction at the centre O is?



(A) $\frac{3\mu_0 I}{3a} + \frac{\mu_0 I}{6b} \otimes$

(B) $\frac{3\mu_0 I}{7a} + \frac{\mu_0 I}{6b} \otimes$

(C) $\frac{3\mu_0 I}{8a} + \frac{\mu_0 I}{8b} \otimes$

(D) $\frac{2\mu_0 I}{6a} + \frac{\mu_0 I}{8b} \otimes$

Q11 A current carrying wire AB of the length $2\pi R$ is turned along a circle, as shown in figure. The magnetic field at the centre O.



(A) $\frac{\mu_0 i}{2R} \left(\frac{2\pi - \theta}{2\pi}\right)^2$

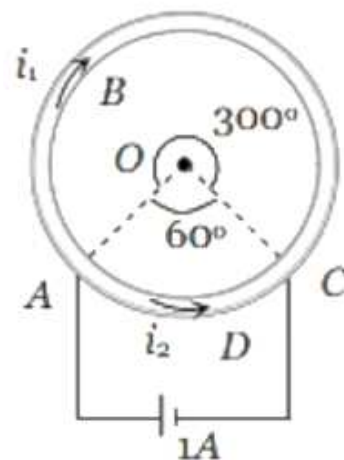
(B) $\frac{\mu_0 i}{2R} \left(\frac{2\pi - \theta}{2\pi}\right)$

(C) $\frac{\mu_0 i}{2R} (2\pi - \theta)$

(D) $\frac{\mu_0 i}{2R} (2\pi + \theta)^2$

Q12 A cell is connected between the points A and C of a circular conductor ABCD of centre O with angle AOC = 60°. If B₁ and B₂ are the magnitudes of the magnetic fields at O due to

the currents in ABC and ADC, respectively, the ratio B₁/B₂ is



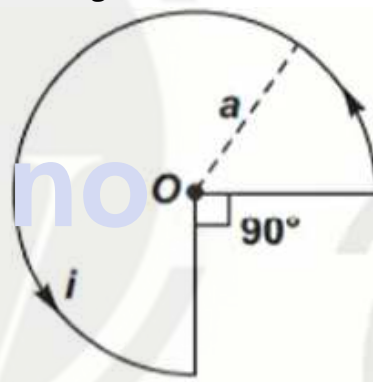
(A) 0.2

(B) 6

(C) 1

(D) 5

Q13 For the arrangement as shown in the figure, the magnetic induction at the centre is



(A) $\frac{3\mu_0 i \pi}{4a}$

(B) $\frac{\mu_0 i}{4\pi a} (1 + \pi)$

(C) $\frac{\mu_0 i}{4\pi a}$

(D) $\frac{3\mu_0 i}{8al}$



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Answer Key

Q1 A
Q2 B
Q3 B
Q4 B
Q5 B
Q6 A
Q7 A

Q8 A
Q9 B
Q10 C
Q11 A
Q12 C
Q13 D



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