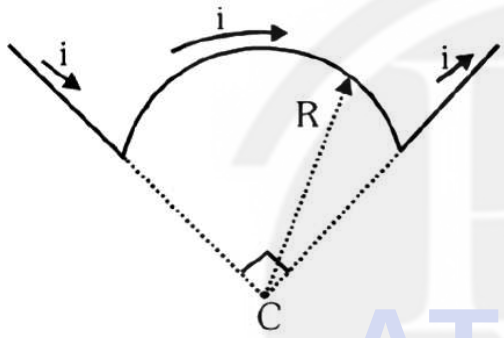
Prayas JEE (2025)

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 $\frac{\pi}{2}\text{rad}$,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



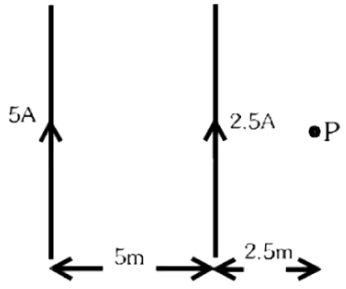
(A) $|\vec{B}| = \frac{\mu_0 i}{8R}$ into the plane of the figure

(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 $'\mathrm{P}'$ due to both infinite long current carrying wires is



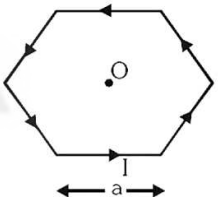
(A) $\frac{\mu_0}{2\pi}\otimes$

(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



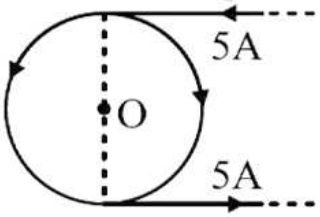
(A) $\frac{6\mu_0 I}{\pi a}$

(B) $\frac{\sqrt{3}\mu_0}{\pi a}$

(C) $6\sqrt{3}\frac{\mu_0 I}{\pi a}$

(D) $\frac{\mu_0 I}{\sqrt{3}\pi a}$

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



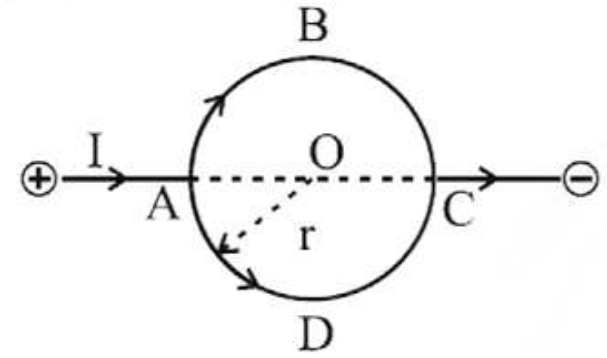
(A) $2\times10^{-5}\ \mathrm{T},\otimes$

(B) $10^{-5}\ \mathrm{T},\odot$

(C) $10^{-5}T,\otimes$

(D) $2\times10^{-5}\ \mathrm{T},\odot$

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



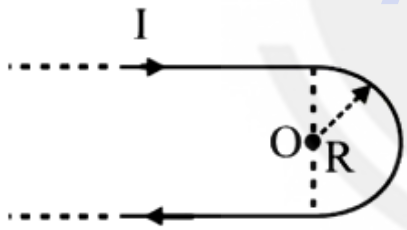
(A) $\frac{\mu_0 I}{6r}\otimes$

(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



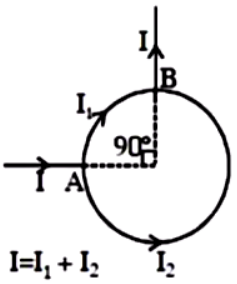
(A) $\frac{\mu_0 I}{2R}\left(\frac{1}{\pi}+\frac{1}{2}\right)\otimes$

(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

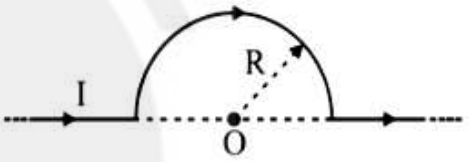
(A) Zero

(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.



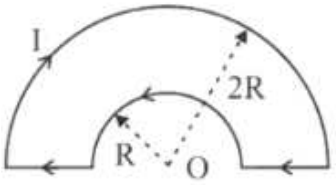
(A) $\frac{\mu_0 I}{4I}\otimes$

(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.



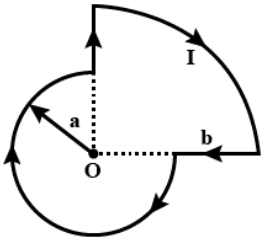
(A) $\frac{\mu_0 I}{6R}$

(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?



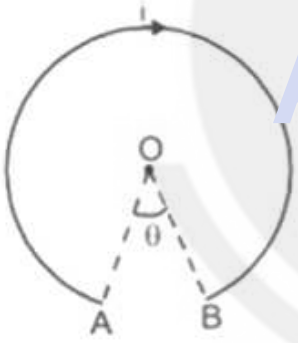
(A) $\frac{3\mu_0 I}{3a} + \frac{\mu_0 I}{6b}\otimes$

(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.



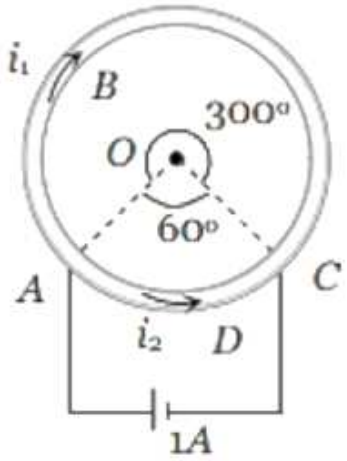
(A) $\frac{\mu_0 i}{2R}\left(\frac{2\pi-\theta}{2\pi}\right)^2$

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

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

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

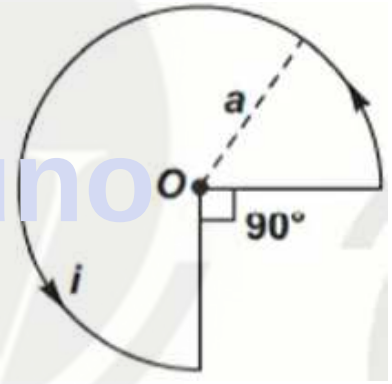
Q12 A cell is connected between the points A and C of a circular conductor ABCD of centre O with angle $\mathrm{AOC} = 60^\circ$. If B_1 and B_2 are the magnitudes of the magnetic fields at O due to the currents in ABC and ADC, respectively, the ratio B_1/B_2 is



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

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

Android App | iOS App | PW Website