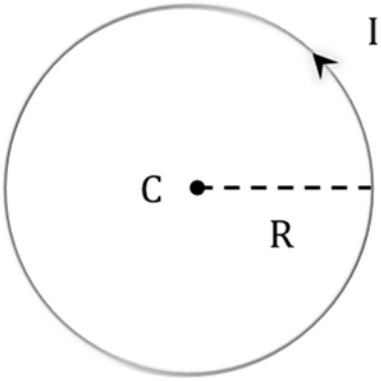
Q.1 Due to the flow of current in the circular loop of radius R magnetic induction produced at the centre of the loop is B.The magnetic moment of the loop is,



(A) $\frac{BR^3}{2\pi\mu_0}$ **(B)** $\frac{BR^2}{2\pi\mu_0}$ **(C)** $\frac{2\pi BR^3}{\mu_0}$ **(D)** $\frac{2\pi BR^2}{\mu_0}$

Q.2 A circular coil of radius 2.5 cm carries current of 2 A. If the coil has 50 turns. Find the magnetic field at the center of the coil?

(A) $\frac{\pi}{6250}$ T **(B)** $\frac{\pi}{625}$ T **(C)** $\frac{\pi}{125}$ T **(D)** $\frac{\pi}{1250}$ T

Q.3 A wire of fixed length is bent to form a coil of one turn. It is again bent to form a coil of three turns. If in both cases same amount of current is passed, then the ratio of the intensities of magnetic field produced at the centre of the coil of one turn and three turns respectively will be,

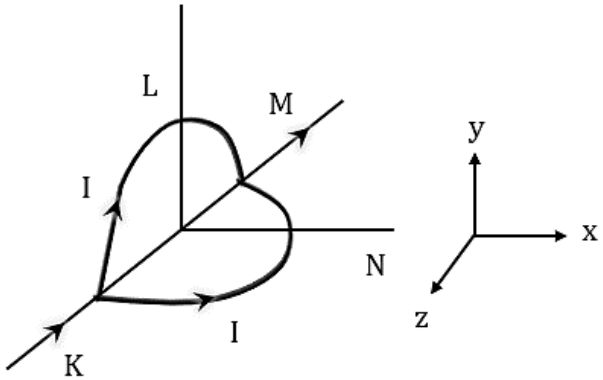
(A) 2: 1 **(B)** 9: 1 **(C)** 1: 9 **(D)** 1: 3

Q.4 Two concentric circular coils X and Y of radii 16 cm and 10 cm respectively lie in same vertical plane containing the north-south direction. Coil X has 20 turns and carries a current of 16 A, coil Y has 25 turns and carries a current of 18 A. The sense of current in X is anticlockwise and in coil Y it is clockwise, for an observer looking at the coils, facing the west. The magnitude and direction of the magnetic field at their common centre is: (Neglect horizontal component of Earth's magnetic field)

(A) $4\pi \times 10^{-4}$ T towards the east **(B)** $5\pi \times 10^{-4}$ T towards the west

(C) $9\pi \times 10^{-4}$ T towards the west **(D)** $9\pi \times 10^{-4}$ T towards the east

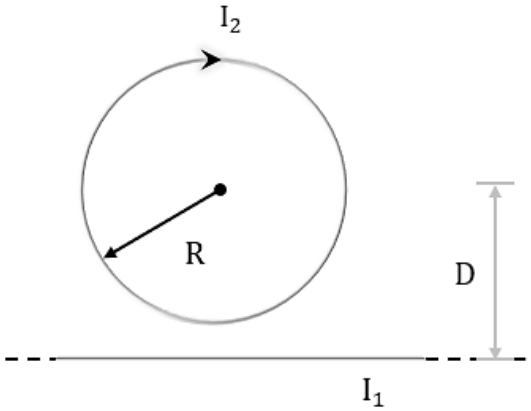
Q.5 A circular loop of radius r is bent along a diameter and given a shape as shown in the figure. One of the semicircles lies in xz −plane and the other one in yz −plane, with their centres at origin. The same current I flows through each of the semicircles as shown. The net magnetic field at the origin is,



(A) $\frac{\mu_0 I}{4r}(\hat{i}+\hat{j})$ **(B)** $\frac{\mu_0 I}{4r}(-\hat{i}-\hat{j})$ **(C)** $\frac{\mu_0 I}{4r}(-\hat{i}+\hat{j})$ **(D)** $\frac{\mu_0 I}{4r}(-\hat{i}-\hat{j})$

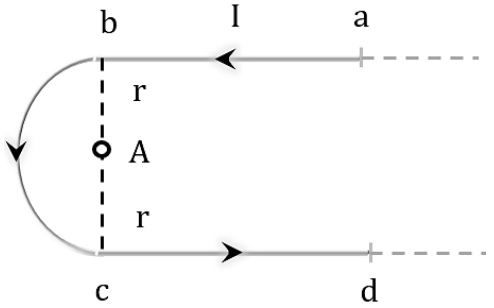
Q.6 A circular loop of radius R carries current I_2 in a clockwise direction, as shown in the figure. The centre of the loop is at a distance D above a long straight wire. What should be the magnitude and

direction of the current I_1 in the straight wire so that the net magnetic field at the centre of the loop is zero?



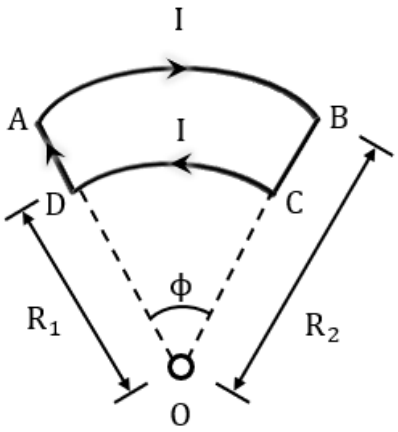
(A) $\frac{\pi D}{R} I_2$ $(\rightarrow)$ **(B)** $\frac{\pi D}{R} I_2$ $(\leftarrow)$ **(C)** $\frac{\pi D}{4R} I_2$ $(\rightarrow)$ **(D)** $\frac{\pi D}{4R} I_2$ $(\leftarrow)$

Q.7 A long wire *abcd* is bent in the form of a hair pin, as shown in the diagram. The radius of the semicircular path of the wire is 25 cm. Calculate the magnetic field at the centre of the semicircular part, when a current of 5 A passes through it.



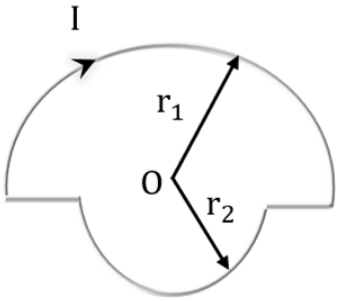
(A) 5×10^{-5} T **(B)** 10^{-5} T **(C)** 7×10^{-5} T **(D)** 9×10^{-5} T

Q.8 Figure shows current loop having two circular arcs joined by two radial lines. Find the magnetic field B at the center O.
[Take $R_1 = 5$ cm , $R_2 = 10$ cm , $I = \frac{2}{\pi}$ A and $\phi = \frac{\pi}{4}$ rad]



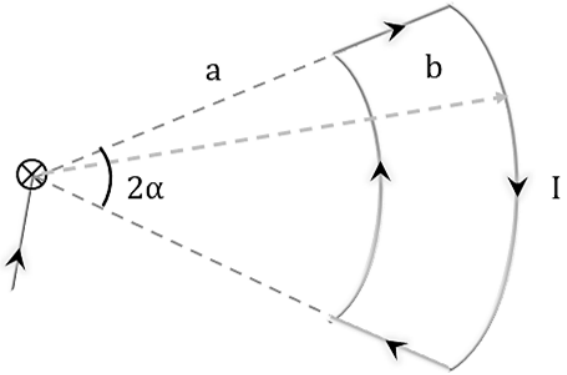
(A) 0.05 Mt **(B)** 0.5 μT **(C)** 5 μT **(D)** Zero

Q.9 A straight wire is bent in a shape shown in the diagram. It carries a steady current I. The magnetic field at the Center O of the arcs will be,



(A) $\frac{\mu_0 I}{4}\left(\frac{r_1}{r_2^2}\right)\otimes$ (B) $\frac{\mu_0 I}{4}\left(\frac{1}{r_2}\right)\odot$ (C) $\frac{\mu_0 I}{4}\left(\frac{r_1+r_2}{r_1 r_2}\right)\otimes$ (D) $\frac{\mu_0 I}{4}\left(\frac{r_1+r_2}{r_1 r_2}\right)\odot$

Q.10 A loop with current I is in field of a long straight wire with current I_0 The plane of the loop is perpendicular to the straight wire. Find torque acting on the loop.



(A) $\frac{2(b-a)\mu_0 I_0 I\sin\theta}{\pi}$ (B) $\frac{(b-a)\mu_0 I_0 I\sin\theta}{2\pi}$ (C) $\frac{(b-a)\mu_0 I_0 I\sin\theta}{\pi}$ (D) $\frac{(b-a)\mu_0 I_0 I\sin\theta}{4\pi}$

ANSWER KEY

Q.	1	2	3	4	5	6	7	8	9	10
Sol.	(C)	(D)	(C)	(B)	(C)	(A)	(B)	(B)	(C)	(C)