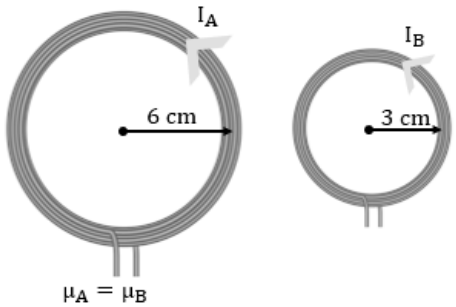
Q.1 Two circular currents carrying coils of radius 3 cm and 6 cm are having equal magnetic moment. Find the ratio of current in the loops.



(A) 4 : 1 **(B)** 9 : 1 **(C)** 2 : 1 **(D)** 1 : 3

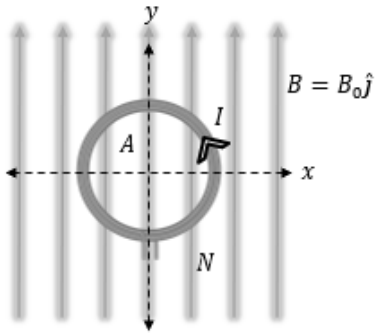
Q.2 A current carrying loop is placed in a uniform magnetic field. The torque acting on it does not depend on

(A) shape of the loop. **(B)** area of the loop.
(C) number of turns in the loop. **(D)** strength of the current

Q.3 A square coil 20 cm × 20 cm has 100 turns and carries a current of 1 A. It is placed in a uniform magnetic field B = 0.5 T with the direction of magnetic field parallel to the plane of the coil. The magnitude of the external torque required to hold this coil in this position is

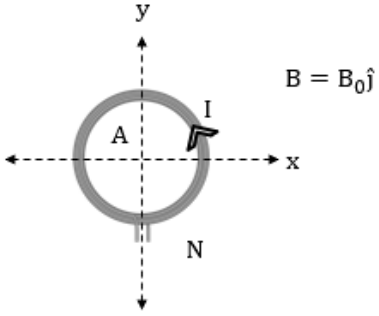
(A) Zero **(B)** 200 Nm **(C)** 2 Nm **(D)** 10 Nm

Q.4 A circular coil with area A and N turns is free to rotate about a diameter that coincides with the x −axis. Current I is circulating in the coil. There is a uniform magnetic field $\vec{B}$ in the positive y − direction. Calculate the magnitude and direction of the torque $\vec{\tau}$.



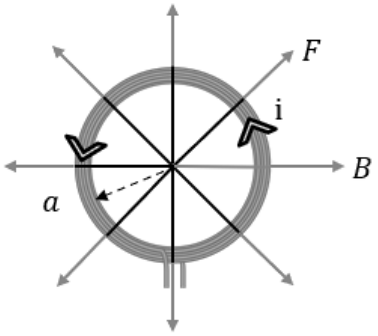
(A) NIAB ; $\hat{j}$ **(B)** NIAB ; $-\hat{j}$ **(C)** NIAB ; $\hat{i}$ **(D)** Zero

Q.5 A circular coil with area A and N turns is free to rotate about a diameter that coincides with the x −axis. CurrentI is circulating in the coil. There is a uniform magnetic field $\vec{B}$ in the positive y − direction. Calculate the magnitude and direction of the torque $\vec{\tau}$.



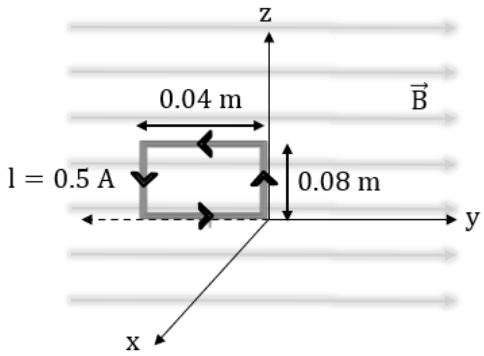
(A) NIAB ; $\hat{j}$ **(B)** NIAB ; $-\hat{j}$ **(C)** Zero **(D)** NIAB ; $\hat{i}$

Q.6 A circular loop of radius $a = 7$ cm, carrying a current $i = \frac{2}{7}$ A, is placed in a two-dimensional magnetic field. The centre of the loop coincides with the centre of the field. The strength of the magnetic field at the periphery of the loop is B. Find B if the magnetic force on the wire is 2π N.



(A)20 T **(B)**25 T **(C)**7 T **(D)**50 T

Q.7 The rectangular coil having100 turns is placed in a uniform magnetic field of $\frac{0.05}{\sqrt{2}}\hat{j}$ T as shown in figure. Find the torque acting on the loop.



(A)$10 \times 10^{-3}\hat{k}$ Nm **(B)**$5.66 \times 10^{-3}\hat{k}$ Nm **(C)**$5.66 \times 10^{-3}\hat{\imath}$ Nm **(D)**$10 \times 10^{-3}\hat{\imath}$ Nm

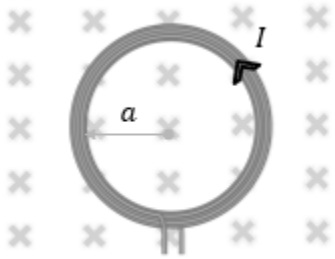
Q.8 Two quarter circular loops of wire that carry a current of 14 A are as shown in the figure below. Radius of each quarter circle is $a = 5$ cm. Two uniform magnetic fields,B = 0.03 T are directed in the $+x$ direction in one quarter circle and $-x$ direction in the other. Find the torque on the entire loop and the direction in which it will rotate.

(A) Zero **(B)**0.0008 Nm, Anti clockwise direction
(C)0.0008 Nm, Clockwise direction **(D)**Data insufficient to determine the torque

Q.9 Suppose that the radius of cross-section of the wire used in the figure is 2×10^{-3} unit. The increase in the radius of the loop is $\frac{Ia^2B}{\pi NY}$ if the magnetic field B is switched off. Young's modulus of the material of the wire is Y. Find the value of N.

(A) $\frac{10^6}{4}$ **(B)** $\frac{10^6}{2}$ **(C)** 2×10^{-6} **(D)** 4×10^{-6}

Q.10 The figure shows a circular wire-loop of radius a = 20 cm, carrying a current I, placed in a perpendicular magnetic field 4 T. If the tension in the wire is 4 N, find the value of I.



(A) 0.5 A **(B)** 1 A **(C)** 5 A **(D)** 10 A

ANSWER KEY

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