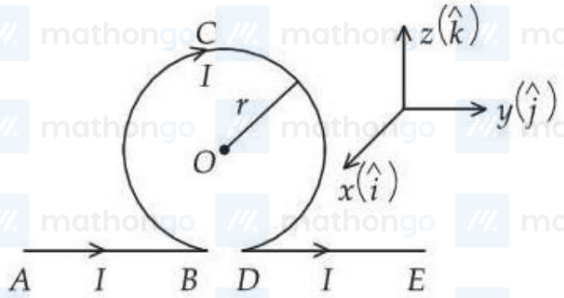
Q1. 21 January Shift 1

A current carrying solenoid is placed vertically and a particle of mass m with charge Q is released from rest. The particle moves along the axis of solenoid. If g is acceleration due to gravity then the acceleration (a) of the charged particle will satisfy :

(1) $a > g$ (2) $0 < a < g$ (3) $a = 0$ (4) $a = g$

Q2. 21 January Shift 2

An infinitely long straight wire carrying current I is bent in a planer shape as shown in the diagram. The radius of the circular part is r. The magnetic field at the centre O of the circular loop is :



(1) $-\frac{\mu_0}{2\pi}\frac{I}{r}(\pi - 1)\hat{i}$ (2) $\frac{\mu_0}{2\pi}\frac{I}{r}(\pi - 1)\hat{i}$

(3) $-\frac{\mu_0}{2\pi}\frac{I}{r}(\pi + 1)\hat{i}$ (4) $\frac{\mu_0}{2\pi}\frac{I}{r}(\pi + 1)\hat{i}$

Q3. 23 January Shift 2

The current passing through a conducting loop in the form of equilateral triangle of side $4\sqrt{3}$ cm is 2 A. The magnetic field at its centroid is $\alpha \times 10^{-5}$ T. The value of α is ____.

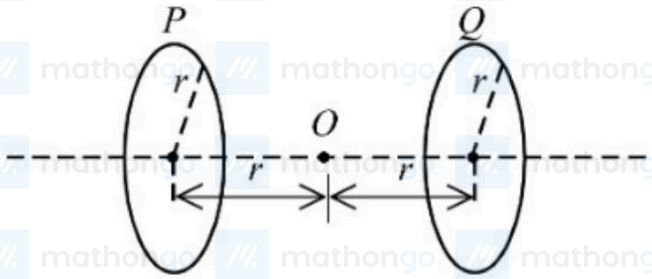
(Given : $\mu_o = 4\pi \times 10^{-7}$ SI units)

(1) $2\sqrt{3}$ (2) $\frac{\sqrt{3}}{2}$ (3) $3\sqrt{3}$ (4) $\sqrt{3}$

Q4. 24 January Shift 1

A short bar magnet placed with its axis at 30° with an external field of 800 Gauss, experiences a torque of 0.016 N. m. The work done in moving it from most stable to most unstable position is $\alpha \times 10^{-3}$ J. The value of α is ____.

Q5. 24 January Shift 2



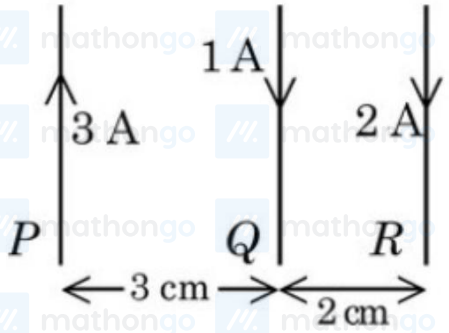
Two identical circular loops P and Q each of radius r are lying in parallel planes such that they have common axis. The current through P and Q are I and $4I$ respectively in clockwise direction as seen from O. The net magnetic field at O is:

(1) $\frac{3\mu_o I}{4\sqrt{2}r}$ towards Q (2) $\frac{\mu_o I}{4\sqrt{2}r}$ towards Q

(3) $\frac{3\mu_0 I}{4\sqrt{2}r}$ towards P (4) $\frac{\mu_o I}{4\sqrt{2}r}$ towards P

Q6. 28 January Shift 1

Three long straight wires carrying current are arranged mutually parallel as shown in the figure. The force experienced by 15 cm length of wire Q is ____.



($\mu_o = 4\pi \times 10^{-7}$ T. m/A)

(1) 6×10^{-6} N towards P (2) 6×10^{-7} N towards P

(3) 6×10^{-7} N towards R (4) 6×10^{-6} N towards R

Q7. 28 January Shift 1

The magnetic field at the centre of a current carrying circular loop of radius R is 16μ T. The magnetic field at a distance $x = \sqrt{3}R$ on its axis from the centre is ____ μT.

(1) 4 (2) 2 (3) $2\sqrt{2}$ (4) 8

Q8. 28 January Shift 2

A long cylindrical conductor with large cross section carries an electric current distributed uniformly over its cross-section. Magnetic field due to this current is :

A. maximum at either ends of the conductor and minimum at the midpoint

B. maximum at the axis of the conductor

C. minimum at the surface of the conductor

D. minimum at the axis of the conductor

E. same at all points in the cross-section of the conductor

Choose the correct answer from the options given below :

(1) A, D Only (2) D Only (3) E Only (4) B, C Only

ANSWER KEYS

1. (4) **2.** (1) **3.** (3) **4.** 64 **5.** (1) **6.** (4) **7.** (2) **8.** (2)