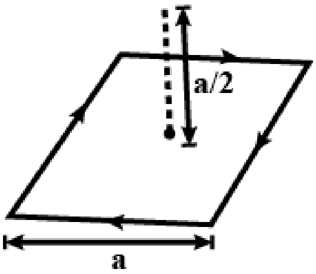
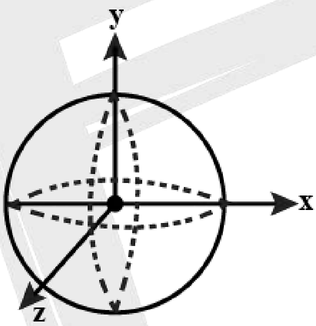
DPP – 04

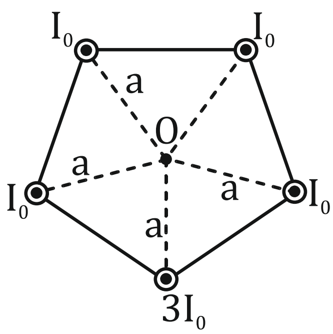
Q.1 The magnetic field due to a current carrying square loop of side a at a point located symmetrically at a distance of a/2 from its centre as shown in figure is $\frac{2\mu_0 i}{\sqrt{K}\pi a}$. Value of K is



Q.2 Three rings, each having equal radius R, are placed mutually perpendicular to each other and each having its centre at the origin of co-ordinate system. If current I is flowing through each ring then the magnitude of the magnetic field at the common centre is $\sqrt{\alpha+\beta}\frac{\mu_0 I}{2R}$. value of $\alpha+\beta$ is.

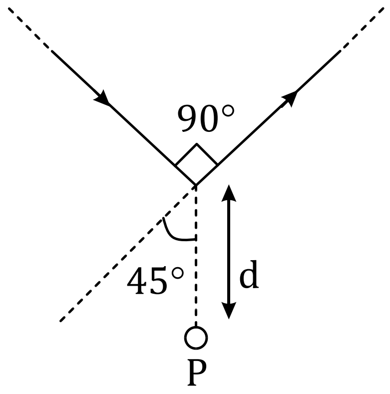


Q.3 Five parallel infinite wires are placed at the vertices of a regular pentagon. Four wires carry current I_0 each while the fifth wire carries current $3I_0$ as shown. The resultant magnetic field at the centre O is :



(A) zero (B) $\frac{\mu_0 I_0}{2\pi a}$ (C) $\frac{\mu_0 I_0}{\pi a}$ (D) infinite

Q.4 Find the magnetic filed at P due to the arrangement shown:



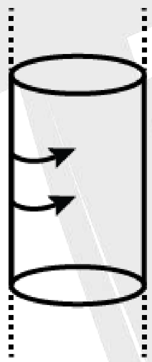
(A) $\frac{\mu_0 i}{\sqrt{2}\pi d}\left(1-\frac{1}{\sqrt{2}}\right)\otimes$

(B) $\frac{2\mu_0 i}{\sqrt{2}\pi d}\otimes$

(C) $\frac{\mu_0 i}{\sqrt{2}\pi d}\otimes$

(D) $\frac{\mu_0 i}{\sqrt{2}\pi d}\left(1+\frac{1}{\sqrt{2}}\right)\otimes$

Q.5 A hollow cylinder having infinite length and carrying uniform current per unit length λ along the circumference as shown. Magnetic field inside the cylinder is:



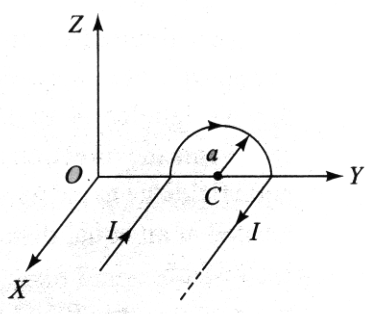
(A) $\frac{\mu_0\lambda}{2}$

(B) $\mu_0\lambda$

(C) $2\mu_0\lambda$

(D) none of these

Q.6 A long wire bent as shown in figure carries current I. If the radius of the semicircular portion is a, the magnetic field at the center C is :



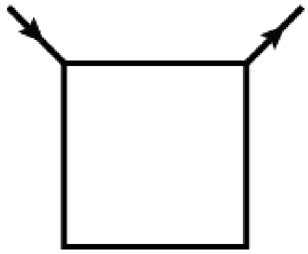
(A) $\frac{\mu_0 I}{4a}$

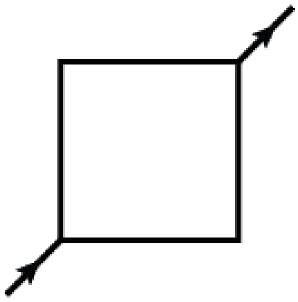
(B) $\frac{\mu_0 I}{4\pi a}\sqrt{\pi^2+4}$

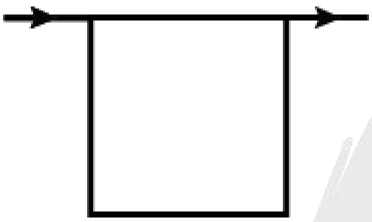
(C) $\frac{\mu_0 I}{4a}+\frac{\mu_0 I}{4\pi a}$

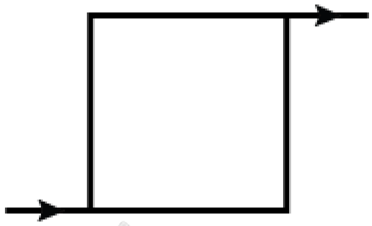
(D) $\frac{\mu_0 I}{4\pi a}\sqrt{(\pi^2-4)}$

Q.7 Current flows through uniform, square frames as shown. In which case is the magnetic field at the centre of the frame not zero?

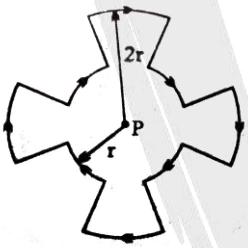
(A) 

(B) 

(C) 

(D) 

Q.8 A current I flows around a closed path in the horizontal plane of the circle as shown in the figure. The path consists of eight arcs with alternating radii r and 2r. Each segment of arc subtends equal angle at the common centre P. The magnetic field produced by current path at point P is:



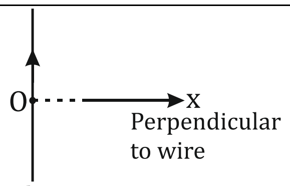
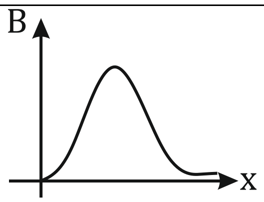
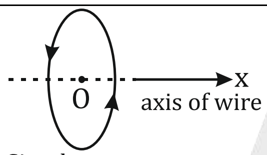
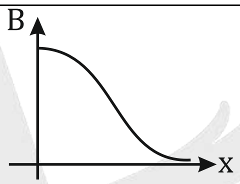
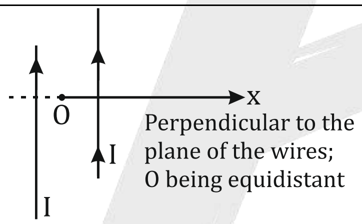
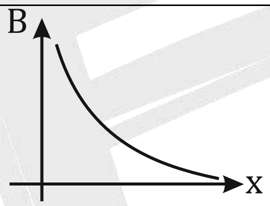
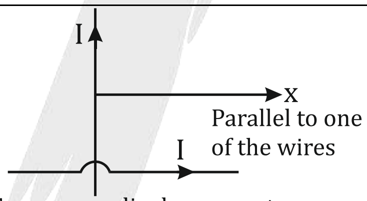
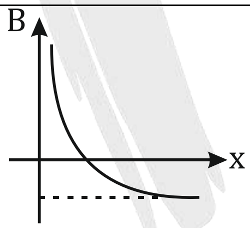
(A) $\frac{3}{8}\frac{\mu_0 I}{r}$; perpendicular to the plane of the paper and directed inward.

(B) $\frac{3}{8}\frac{\mu_0 I}{r}$; perpendicular to the plane of the paper and directed outward.

(C) $\frac{1}{8}\frac{\mu_0 I}{r}$; perpendicular to the plane of the paper and directed inward.

(D) $\frac{1}{8}\frac{\mu_0 I}{r}$; perpendicular to the plane of the paper and directed outward.

Q.9 The entries in Column-I depict certain current distributions, while the entries in Column-II depict the variation of the magnetic field (B) as one moves along the x-axis for each of these distributes, but in a different order. Match the entries in Column-I with the proper entries in Column-II.

	Column-I		Column-II
(a)	 Straight current carrying wire	(p)	
(b)	 Circular current carrying wire	(q)	
(c)	 Parallel current carrying wire in the same plane	(r)	
(d)	 Two perpendicular current carrying wires in the same plane	(s)	

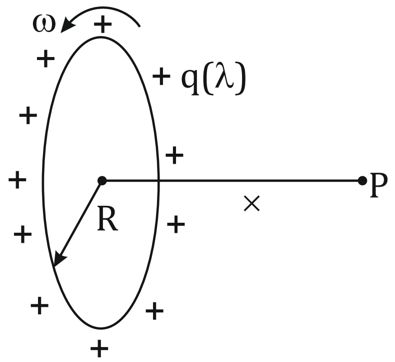
(A) (a)-r; (b)-q; (c)-p; (d)-s

(B) (a)-s; (b)-q; (c)-p; (d)-r

(C) (a)-r; (b)-p; (c)-q; (d)-s

(D) (a)-q; (b)-r; (c)-p; (d)-s

Q.10 Magnetic Field on the center of a Spinning Charged Ring



(A) $B = \frac{\mu_0 \omega \lambda}{3}$

(B) $B = \frac{\mu_0 \omega \lambda}{0}$

(C) $B = \frac{\mu_0 \omega \lambda}{2}$

(D) $B = \frac{\mu_0 \omega \lambda}{1}$

ANSWER KEY

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