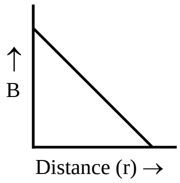
DPP – 1 (Magnetic Field & Force)

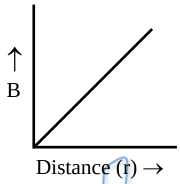
Video Solution on Website:- https://physicsaholics.com/home/courseDetails/34

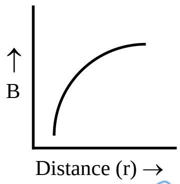
Video Solution on YouTube:- https://youtu.be/LbtAgQdCy0I

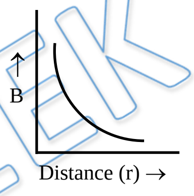
Written Solution on Website:- https://physicsaholics.com/note/notesDetalis/50

Q 1. Which of the following graphs represent variation of magnetic field B with distance r for a straight long wire carrying current

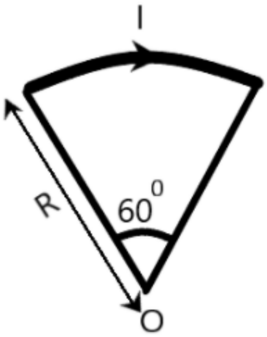
(a)


(b)


(c)


(d)


Q 2. The magnitude of magnetic field due to current carrying arc of radius R, having a current I subtending an angle of 60° at the center O is



(a) $\frac{\mu_0 I}{8R}$ (b) $\frac{\mu_0 I}{10R}$

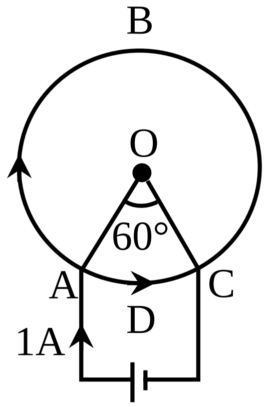
(c) $\frac{2\mu_0 I}{4R}$ (d) $\frac{\mu_0 I}{12R}$

Q 3. A cell is connected between two points of a uniformly thick circular conductor. I_1 and I_2 are the currents flowing in two parts of the circular conductor of radius a. What will be the magnetic field at the center of the loop?

(a) $zero$ (b) $\frac{\mu_0}{4\pi}\frac{(I_1+I_2)\sin 90^0}{r^2}$

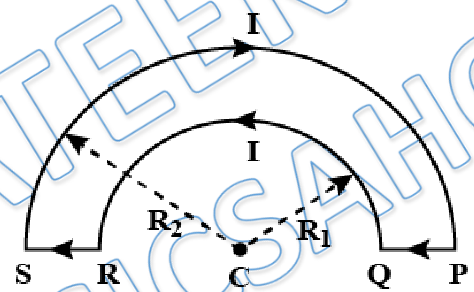
(c) $\frac{\mu_0}{4\pi}\frac{(I_1 I_2)\sin 90^0}{r^2}$ (d) $\frac{\mu_0}{4\pi}\frac{2(I_1+I_2)}{r^2}$

Q 4. A cell is connected between the points A and C of a circular conductor ABCD with O as centre and angle AOC = 60° If B_1 and B_2 are the magnitudes of the magnetic fields at O due to the currents in ABC and ADC respectively, then ratio $\frac{B_1}{B_2}$ is



(a) 1 (b) 2
(b) 3 (d) 4

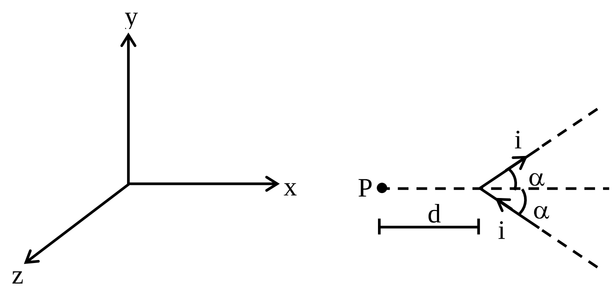
Q 5. A wire loop PQRSP formed by joining two semicircular wires of radii R_1 & R_2 carries a current I as shown in figure below. The magnitude of magnetic induction at center C is



(a) $\left(\frac{\mu_0}{4}\right) I \left[\frac{1}{R_2} - \frac{1}{R_1}\right]$ (b) $\left(\frac{\mu_0}{4}\right) I \left[\frac{1}{R_1} - \frac{1}{R_2}\right]$
(c) $(\mu_0) I \left[\frac{1}{R_2} - \frac{1}{R_1}\right]$ (d) $(\mu_0) I \left[\frac{1}{R_1}\right]$

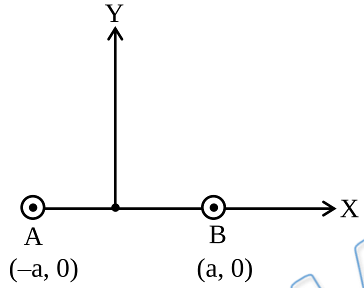
Q 6. A straight section PQ of a circuit lies along the x-axis from x = – (a/2) to x = + (a/2) and carries a steady current I. The magnetic field due to the section PQ at a point x = +a will be -
(a) proportional to a (b) proportional to a^2
(c) proportional to (1/a) (d) equal to zero

Q 7. V shaped wire is in x-y plane. The direction of the field B at P is –



(a) along + x axis (b) along + z axis
(c) along – x axis (d) along + y axis

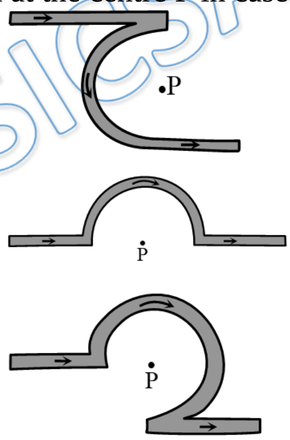
Q 8. Two very long current carrying wires A and B carrying current I_0 (along Z-axis) are placed at (– a, 0) and (a, 0) as shown. Find the value of magnetic field at (0, a) –



(a) $\frac{\mu_0 I_0}{\sqrt{2}\pi a}$ (b) $\frac{\mu_0 I_0}{2\pi a}$

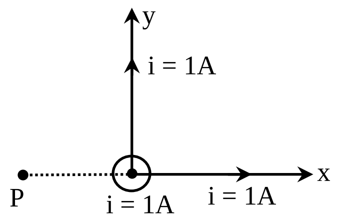
(c) $\frac{\mu_0 I_0}{4\pi a}$ (d) $\frac{\mu_0 I_0}{2\sqrt{2}\pi a}$

Q 9. The magnetic field at the center of a circular coil of radius r is π times that due to a long straight wire at a distance r from it, for equal currents. Figure here shows three cases: in all cases the circular part has radius r and straight ones are infinitely long. For same current the B field at the centre P in cases 1, 2, 3, have the ratio:



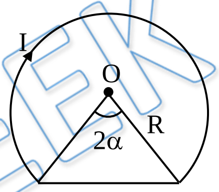
(a) $-\frac{\pi}{2}:\frac{\pi}{2}:\frac{3\pi}{4}-\frac{1}{2}$
(b) $-\frac{\pi}{2}-1:\frac{\pi}{2}:\frac{3\pi}{4}+\frac{1}{2}$
(c) $-\frac{\pi}{2}:\frac{\pi}{2}:3\frac{\pi}{4}$
(D) $-\frac{\pi}{2}-1:\frac{\pi}{2}-\frac{1}{4}:\frac{3\pi}{4}+\frac{1}{2}$

Q 10. Three infinitely long wires each carrying a current 1 A are placed such that one end of each wire is at origin and one of these wires are along x-axis, y-axis and z-axis. Magnetic induction at point P (–2,0,0) is –



(a) $\frac{\mu_0}{4\pi}(\hat{j}+\hat{k})$
(b) $\frac{\mu_0}{4\pi}(\hat{j}-\hat{k})$
(c) $\frac{\mu_0}{8\pi}(-\hat{j}+\hat{k})$
(d) $\frac{\mu_0}{8\pi}(\hat{j}+\hat{k})$

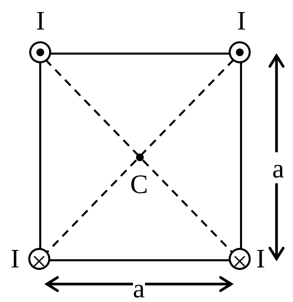
Q 11. The magnetic field intensity due to a thin wire carrying current I in the fig is $\frac{\mu_0 i}{k\pi R}(\pi - \alpha + \tan\alpha)$ find the value of k is



(a) 1 (b) 3
(c) 2 (d) 4

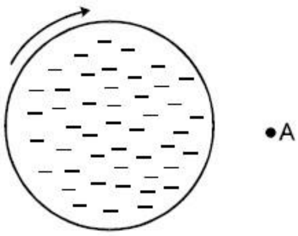
Q 12. Ratio of magnetic field at the center of a current carrying coil of radius R and at a distance of 3R on its axis is -
(a) $10\sqrt{10}$ (b) $20\sqrt{10}$
(c) $2\sqrt{10}$ (d) $\sqrt{10}$

Q 13. Four long and parallel wires each carrying current I are kept at the corners of a square having side a. Magnetic field produced at centre C is k $\frac{\mu_0 I}{\pi a}$. find the k



(a) 2 (b) $\sqrt{2}$
(c) 1 (d) $1/\sqrt{2}$

Q 14. The negatively and uniformly charged nonconducting disc as shown is rotated clockwise. The direction of the magnetic field at point A in the plane of the disc is –



(a) into the page
(b) out of the page
(c) up to the page
(d) down the page

Answer Key

Q.1 d	**Q.2 d**	**Q.3 a**	**Q.4 a**	**Q.5 b**
Q.6 d	**Q.7 b**	**Q.8 b**	**Q.9 a**	**Q.10 c**
Q.11 c	**Q.12 a**	**Q.13 a**	**Q.14 a**	