Electromagnetism: Magnetic Effect of Electric Current

Answers to Typical Questions (Set-1)

A-1	(a) Coming out of paper; (b) Entering paper; (c) East to West; (d) West to East
A-2	$\frac{i}{2\pi c^2 \varepsilon_0 d}$
A-3	Magnetic field inside the circular wire, is going away from him.
A-4	-
A-5	-
A-6	A loop that encloses wire carrying current.
A-7	No
A-8	Movable conductor would align parallel to fixed conductor and get repelled from it.
A-9	Depends upon relative magnitudes of F_e and F_{em}
A-10	No
A-11	Does not allow unidirectional magnetic field in untwisted connecting wires.
A-12	No
A-13	(c)
A-14	(c)
A-15	(a)
A-16	(d)
A-17	(b)
A-18	(d)
A-19	(c)
A-20	(c)
A-21	(c)
A-22	(b)
A-23	(c)
A-24	(a)
A-25	(a), (b)
A-26	(a), (b), (c)
A-27	(b), (c), (d)
A-28	(b), (c)
A-29	(b), (c)
A-30	(a), (b)
A-31	(b), (c)
A-32	Yes
A-33	2×10^{-6}T along Y-axis
A-34	5×10^{-3}T
A-35	2.5 μT
A-36	$\vec{B}_p = 2.0 \times 10^{-5}\hat{k}$, and $\vec{B}_q = 0$
A-38	5.0×10^{-4} T
A-39	1mm behind the conductor.
A-40	(a) 0.67×10^{-2} T, (b) 2.7×10^{-2}T (c) 2.0×10^{-2}T and (d) 1.4×10^{-2}T
A-41	1.7×10^{-4}T along a line perpendicular wires A-B, parallel to AB from in direction B to A, is the answer
A-42	$B_A = 0$, $B_B = 2.0 \times 10^{-6}$T coming out of the plane of the paper, $B_C = 0$, $B_D = 2.0 \times 10^{-6}$T entering the plane of the paper.
A-43	$\vec{B}_P = 0$, $B_{q1} = 1.1 \times 10^{-4}$ T coming out of the plane of the figure, $\vec{B}_{q2} = 0$, $\vec{B}_{q3} = 1.1 \times 10^{-4}$ T entering the plane of the figure, $\vec{B}_{q4} = 0$.
A-44	$10^{-7}\left(\frac{I}{d}\right)$
A-45	Proved
A-46	12 T
A-47	0.07
A-48	$\frac{\sqrt{2}\mu_0 I}{3\pi a}$ entering into the paper, is the answer
A-49	$\frac{2\mu_0 I}{\pi a}\left(\frac{1}{\sqrt{5}} - \frac{1}{3\sqrt{13}}\right)$, coming out of the paper.
A-50	Zero
A-51	Zero
A-52	(a) $\frac{27\mu_0 i}{2\pi l}$ (b) $\frac{8\sqrt{2}\mu_0 i}{\pi l}$
A-53	$\frac{\mu_0 i}{2\pi x}\cot\frac{\alpha}{4}$
A-54	$\frac{2\mu_0 i}{\pi l b}\sqrt{l^2 + b^2}$
A-55	(a) $\frac{\mu_0 i n^2}{2\pi^2 r}\sin\frac{\pi}{n}\tan\frac{\pi}{n}$ (b) $\frac{\mu_0 i}{2r}$

Important Note: You may encounter need of clarification on contents and analysis or an inadvertent typographical error. We would gratefully welcome your prompt feedback on mail ID: subhashjoshi2107@gmail.com. If not inconvenient, please identify yourself to help us reciprocate to you suitably.

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