

Electromagnetism: Current Electricity – Typical Questions (Set 1)**(Answers Only)**

A-1	(a) 60 Ω (b) 45 Ω (b) 10 Ω
A-2	East to west.
A-3	Left to right
A-4	Front to rear
A-5	Brownian motion of charged particles.
A-6	Difference in electrostatics and electrodynamics
A-7	Yes
A-8	$\rho_{Cu} < \rho_{Al}$ is the reason.
A-9	$U \propto i^2$
A-10	Yes
A-11	Yes. Part of energy supplied by battery is stored in capacitor
A-12	No, Yes
A-13	Yes
A-14	Charges go through wire
A-15	Potentiometer.
A-16	No
A-17	Yes, during charging
A-18	(a)
A-19	(d)
A-20	(d)
A-21	(c)
A-22	(b)
A-23	(a)
A-24	(c)
A-25	(a)

A-26	(b)
A-27	(a)
A-28	(a)
A-29	(b)
A-30	(c)
A-31	(d)
A-32	(d)
A-33	(b)
A-34	(a)
A-35	(b), (c)
A-36	(c), (d)
A-37	(d)
A-38	(a)
A-39	(a), (d)
A-40	(a), (d)
A-41	All
A-42	(b), (d)
A-43	(a) IT^{-1} , I, IT (b) 53 A
A-44	3.2×10^{-3} A
A-45	6.0×10^{-4} C
A-46	300 C
A-47	0.074 mm.s^{-1}
A-48	$\pi \times 10^{-6} \Omega\text{m}$
A-49	400 Ω
A-50	$3.2 \times 10^4 \text{ s} \approx 8.9 \text{ hours}$
A-51	0.6 km
A-52	$\frac{\rho l}{\pi ab}$
A-53	(a) 1.25×10^{17} (b) $6.37 \times 10^6 \text{ A/m}^2$
A-54	8.5 mV/m
A-55	25 Vm^{-1}

A-56	84.5° C
A-57	-3.1 V
A-58	1.52 V, 0.07 Ω
A-59	29 Ω
A-60	0.6 Ω
A-61	(a) 0.3 A, (b) 3 A
A-62	(a) 0.51 (b) 1 (c) 1.25
A-63	(a) $\frac{n_1 E}{R + \frac{n_1 r}{n_2}}$ (b) $rn_1 = Rn_2$
A-64	10 mA
A-65	1.6 A, 4.0 A
A-66	0.15 A, 0.83 A
A-67	(a) 1.0 A, (b) 0.67 A, (c) 0.33 A
A-68	12.5 Ω, 170 Ω
A-69	45 Ω, 22.5 Ω
A-70	4 mA in 20 Ω resistor, 8 mA in 10 Ω resistor, and 12 mA in 100 Ω resistor, 1.34 V
A-71	2 Ω
A-72	$\frac{r}{3}$
A-73	(a) 2.08 Ω, (b) 3.33 Ω, (c) 3.75 Ω
A-74	(a) 0.1 A, (b) 0.3 A
A-75	Zero in upper 4 Ω resistor and 0.2 A in the rest two

A-76	1 Amp through 4 Ω , 0.4 A through 20 Ω and 0.6 A through 30 Ω
A-77	1 A in a and zero in b in both the circuits
A-78	(a) $\frac{\frac{E_2}{R_2} - \frac{E_1}{R_1}}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}}$, (b) same in (a)
A-79	2 V, $i_1 = 1$ A, $i_2 = 0$, $i_3 = -1$ A,
A-80	Zero
A-81	Zero
A-82	Any value of R will do
A-83	(a) $\frac{r}{2}$, (b) $\frac{4r}{5}$
A-84	0.4 A
A-85	(a) 1.2 A, (b) 6 V, (c) 12 V, (d) Same as the parts (a), (b) and (c)
A-86	$\frac{5}{6}r$
A-87	(a) $\frac{5}{8}r$, (b) $\frac{4}{3}r$, (c) r , (d) $\frac{r}{4}$, (e) r
A-88	(a) 2 Ω, (b) 1.5 A
A-89	(a) 0.1 A, 4.0 V, (b) 0.08 A, 4.2 V
A-90	(a) 24 V (b) 28 V
A-91	130 Ω
A-92	6 V
A-93	$1.25 \times 10^{-2} \Omega$
A-94	0.251 Ω
A-95	16 cm from A