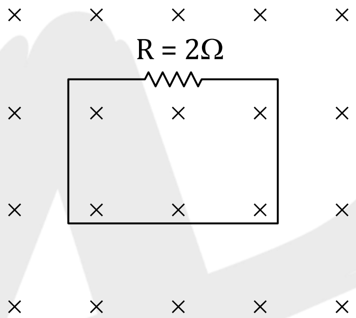
DPP - 1

Q.1 Magnetic flux (in weber) in a closed circuit of resistance 20Ω varies with time t(s) as $\phi = 8t^2 - 9t + 5$. The magnitude of the induced current at $t = 0.25$ s will be mA.

Q.2 A conducting circular loop is placed in $X - Y$ plane in presence of magnetic field $\vec{B} = (3t^3\hat{j} + 3t^2\hat{k})$ in SI unit. If the radius of the loop is 1 m, the induced emf in the loop, at time $t = 2$ s is $n\pi V$. The value of n is

Q.3 In the given figure, the magnetic flux through the loop increases according to the relation $\phi_B(t) = 10t^2 + 20t$, where ϕ_B is in milliwebers and t is in seconds. The magnitude of current through $R = 2\Omega$ resistor at $t = 5$ s is mA.



Q.4 Radius of a circular loop is shrinking at rate of 1 mm/sec. When loop is placed in uniform transverse magnetic field $B = 2T$. then find magnitude of induced emf when radius is 2 cm.

(A) $8\pi V$ (B) $8\pi \times 10^{-5}$ V (C) $4\pi \times 10^{-5}$ V (D) $4\pi \times 10^{-2}$ V

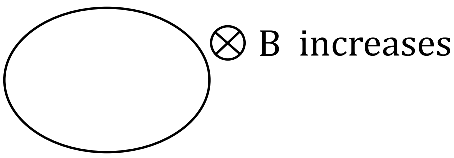
Q.5 A coil (N, A, R) is placed in perpendicular magnetic field B. In time t it is turned by 180° then. Find ratio of Average induced e. m. f. and induced charge flow in

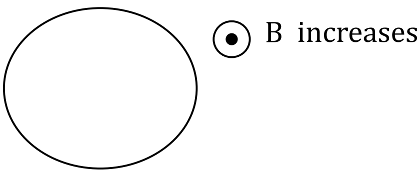
(A) $\frac{t}{R}$ (B) R^2t (C) $\frac{R}{t}$ (D) $N \cdot O.T$

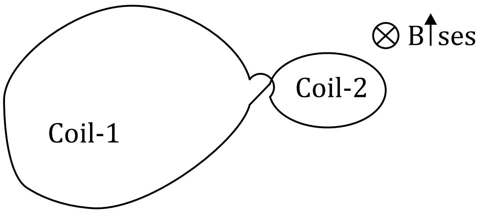
Q.6 A coil of area $\vec{A} = (2\hat{i} + 3\hat{k})m^2$ is placed in magnetic field $\vec{B} = (2\hat{i} + 3\hat{j} + 4\hat{k})T$. The magnetic flux passing from the coil.

(A) 4 wb (B) 16 wb (C) 13 wb (D) 26 wb

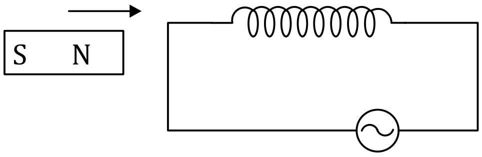
Q.7 Find direction of Induced current in coils.

(A)


(B)


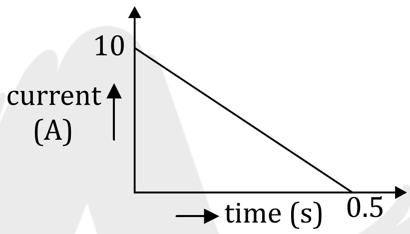
(C)


Q.8 As shown in the figure, a magnet is brought towards a fixed coil. Due to this the induced Emf, current & the charge are E, I & Q respectively. If the speed of the magnet is double then which of the following statement is wrong.



(A) E increase (B) I increase (C) Q does not (D) Q increase change

Q.9 In a coil of resistance 100Ω, a current is induced by changing the magnetic flux through it as shown in the figure. The magnitude of change in flux through the coil is



(A) 200 Wb (B) 225 Wb (C) 250 Wb (D) 275 Wb

Q.10 A conducting metal circular-wire-loop of radius r is placed perpendicular to a magnetic field which varies with time as $B = B_0 e^{-\frac{t}{\tau}}$, where B_0 and τ are constants, at time $t = 0$. If the resistance of the loop is R then the heat generated in the loop after a long time $(t \to \infty)$ is

(A) $\frac{\pi^2 r^4 B_0^4}{2\tau R}$ (B) $\frac{\pi^2 r^4 B_0^2}{2\tau R}$ (C) $\frac{\pi^2 r^4 B_0^2 R}{\tau}$ (d) $\frac{\pi^2 r^4 B_0^2}{\tau R}$

ANSWER KEY

1.	250	**2.**	12	**3.**	60	**4.**	(B)	**5.**	(C)	**6.**	(B)	**7.**	()
8.	(D)	**9.**	(C)	**10.**	(B)								