**Q.1** Hot wire ammeter is based on the principle of

**(A)**Faraday's Law **(B)**Lenz's Law

**(C)**Gauss's Law **(D)**Joule's heating Effect

**Q.2** In hot wire ammeter, when AC is passed, then the length of wire -

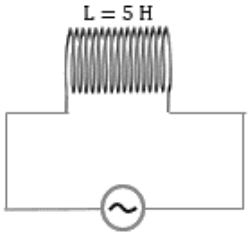
**(A)**Increases **(B)**Decreases

**(C)**Remains Constant **(D)**First Decreases then increases

**Q.3** A coil has negligible resistance and an inductive reactance of **20 Ω** at**50 Hz**. If an AC source of **200 V** and **100 Hz** frequency is connected across the coil, the rms current in the coil will be

**(A)**2.0 A **(B)**5.0 A **(C)**7.0 A **(D)**3.0 A

**Q.4** An inductor of inductance, $\mathbf{L = 5\ H}$ is connected to an AC source having voltage, $\mathbf{V = 10sin\left(10t + \frac{\pi}{6}\right)}$. Find the inductive reactance.




**(A)**20 Ω **(B)**30 Ω **(C)**50 Ω **(D)**70 Ω

**Q.5** A capacitor of capacitive reactance, **12 Ω** is connected with an AC source having voltage,$\mathbf{V3sin(\omega t + \pi/6)}$. Find the expression of instantaneous current in the circuit.

**(A)**$0.35\sin(\omega t + 2\pi/3)$ **(B)**$0.25\sin(\omega t + 2\pi/3)$

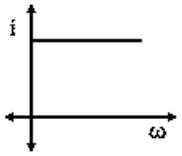
**(C)**$0.57\sin(\omega t - 2\pi/3)$ **(D)**$0.15\sin(\omega t - 2\pi/3)$

**Q.6** The reactance of a capacitor is **100 Ω**, when it is connected to a **100 Hz** AC supply. What will be its reactance, when it is connected to a**50 Hz** AC supply?

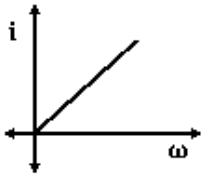
**(A)**200 Ω **(B)**100 Ω **(C)**300 Ω **(D)**400 Ω

**Q.7** An AC supply with constant peak voltage and variable frequency is applied across a capacitor of capacitance**C**. Which of the following graphs correctly depicts the variation of peak current (**i**) with angular frequency(**ω**)?

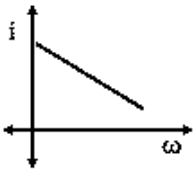
**(A)**



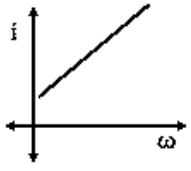

**(B)**




**(C)**




**(D)**



**Q.8** A solenoid of inductance $\mathbf{L = 1\ H}$ is connected across an AC supply of voltage, $\mathbf{V = 100\sin(20t)}$. The maximum energy stored in the solenoid is -

**(A)**25.5 J **(B)**12.5 J **(C)**15.5 J **(D)**17.5 J

**Q.9** Match the following two columns for a series AC circuit.

| Column I | Column II |
|---|---|
| a. Only C in the circuit | p. Current will lead |
| b. Only L in the circuit | q. Voltage will lead |
| c. Only R in the circuit | r. $\phi = 90°$ |
| | s. $\phi = 0°$ |

$\phi$Is the phase difference between current and voltage?

**(A)**a → p, r; b → q, r; c → s **(B)**a → p; b → q; c → s

**(C)**a → p, r; b → q; c → s **(D)**a → p; b → q, r; c → s

**Q.10** A capacitor is connected across an AC supply. The peak value of voltage and current in the circuit are$\mathbf{V_0}$ and $\mathbf{I_0}$ respectively. The magnitude of maximum charge on the plates of the capacitor is

**(A)**$\frac{2I_0}{\omega}$ **(B)**$\frac{I_0}{\sqrt{2}\,\omega}$ **(C)**$\frac{3I_0}{\sqrt{2}\,\omega}$ **(D)**$\frac{4I_0}{\omega}$

## ANSWER KEY

| Q. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sol. | (D) | (A) | (B) | (C) | (B) | (A) | (B) | (B) | (A) | (B) |