

Chapter : **Alternating Current**

Assignment 2

Class 12

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|  **Class : XIIth Subject : PHYSICS** **Date : DPP No. :2** |

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| **Topic :-Alternating Current**  |

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| 1. | The power factor of an AC circuit having resistance *R* and inductance *L* (connected in series) and an angular velocity $ω$ is |
|  | a) | $$R/ωL$$ | b) | $$R/\left(R^{2}+ ω^{2}L^{2}\right)^{1/2}$$ | c) | $$ω L/R$$ | d) | $$R/\left(R^{2}- ω^{2}L^{2}\right)^{1/2}$$ |
| 2. | A uniformly wound solenoidal coil of self inductance $1.8×10^{-4}$ H and resistance $6 Ω$ is broken up into two identical coils. These identical coils are then connected in parallel across a 12 V battery of negligible resistance. The time constant of the current in the circuit and the steady state current through battery is  |
|  | a) | $3 ×10^{-5}$ s, 8 A | b) | $1.5 ×10^{-5}$ s, 8 A | c) | $0.75 ×10^{-4}$ s, 4 A | d) | $6 ×10^{-5}$ s, 2 A |
| 3. | An alternating voltage is connected in series with a resistance $R$ and an inductance $L$. If the potential drop across the resistance is $200 V$ and across the inductance is $150 V$, then the applied voltage is |
|  | a) | 350 $V$ | b) | 250 $V$ | c) | 500 $V$ | d) | 300 $V$ |
| 4. | The number of turns in a secondary coil is twice the number of turns in primary. A leclanche cell of 1.5 V is connected across the primary. The voltage across secondary is |
|  | a) | 1.5 V | b) | 3.0 V | c) | 240 V | d) | Zero |
| 5. | When the rate of change of current is unity, induced emf is equal to  |
|  | a) | Thickness of coil | b) | Number of turns in coil | c) | Coefficient of self-induction | d) | Total flux linked with coil |
| 6. | A coil of wire of certain radius has 100 turns and a self inductance of 15 mH. The self inductance of a second similar coil of 500 turns will be |
|  | a) | 75 mH | b) | 375 mH | c) | 15 mH | d) | None of these |
| 7. | The coefficient of induction of a choke coil is $0.1H$ and resistance is $12Ω$. If it is connected to an alternating current source of frequency $60 Hz$, then power factor will be |
|  | a) | 0.32 | b) | 0.30 | c) | 0.28 | d) | 0.24 |
| 8. | A square loop of side a placed in the same plane as a long straight wire carrying a current $i. $The centre of the loop is at a distance r from the wire, where $r>>a$, figure. The loop is moved away from the wire with a constant velocity $v$. The induced emf in the loop is  |
|  | a) | $$\frac{μ\_{0}i a v}{2 π r}$$ | b) | $$\frac{μ\_{0}i a^{3} v}{2 π r^{3}}$$ | c) | $$\frac{μ\_{0}i v}{2 π }$$ | d) | $$\frac{μ\_{0}i a^{2} v}{2 π r^{2}}$$ |
| 9. | Voltage and current in an ac circuit are given by$V=5\sin(\left(100πt-\frac{π}{6}\right)) $ and $I=4\sin(\left(100 πt+\frac{π}{6}\right))$ |
|  | a) | Voltage leads the current by $30°$ | b) | Current leads the voltage by $30°$ |
|  | c) | Current leads the voltage by $60°$ | d) | Voltage leads the current by $60°$ |
| 10. | A coil is wound on a core of rectangular cross-section. If all the linear dimensions of core are increased by a factor 2 and number of turns per unit length of coil remains same, the self-inductance increases by a factor of  |
|  | a) | 16 | b) | 8 | c) | 4  | d) | 2 |
| 11. | The phase angle between $e.$m.f. and current in $LCR$ series as circuit is |
|  | a) | 0 to $\frac{π}{2}$ | b) | $$\frac{π}{4}$$ | c) | $$\frac{π}{2}$$ | d) | $$Π$$ |
| 12. | The primary winding of a transformer has 200 turns and its secondary winding has 50 turns. If the current in the secondary winding is 40 A, the current in the primary is |
|  | a) | 10 A | b) | 80 A | c) | 160 A | d) | 800 A |
| 13. | The initial phase angle for $i=10\sin(ωt)+8\cos(ωt)$ is |
|  | a) | $$tan^{-1}\left(\frac{4}{5}\right)$$ | b) | $$tan^{-1}\left(\frac{5}{4}\right)$$ | c) | $$sin^{-1}\left(\frac{4}{5}\right)$$ | d) | $$90°$$ |
| 14. | An inductor is connected to an AC source. When compared to voltage , the current in the lead wires |
|  | a) | Is ahead in phase by $π$ | b) | Lags in phase by $π$ |
|  | c) | Is ahead in phase by $\frac{π}{2}$ | d) | Lags in phase by $\frac{π}{2}$ |
| 15. | An ac supply gives $30 V r.m.s.$ which passes through a $10 Ω$ resistance. The power dissipated in it is |
|  | a) | $$90\sqrt{2} W$$ | b) | $$90 W$$ | c) | $$45\sqrt{2} W$$ | d) | 45 $W$ |
| 16. | In a series $LCR$ circuit, operated with an ac of angular frequency $ω$, the total impedance is |
|  | a) | $$\left[R^{2}+\left(Lω-Cω\right)^{2}\right]^{1/2}$$ | b) | $$\left[R^{2}+\left(Lω-\frac{1}{Cω}\right)^{2}\right]^{1/2}$$ |
|  | c) | $$\left[R^{2}+\left(Lω-\frac{1}{Cω}\right)^{2}\right]^{-1/2}$$ | d) | $$\left[\left(Rω\right)^{2}+\left(Lω-\frac{1}{Cω}\right)^{2}\right]^{1/2}$$ |
| 17. | An $LCR$ series circuit is at resonance. Then |
|  | a) | The phase difference between current and voltage is $90°$ |
|  | b) | The phase difference between current and voltage is $45°$ |
|  | c) | Its impedance is purely resistive |
|  | d) | Its impedance is zero |
| 18. | The voltage of domestic ac is $220 volt$. What does the represent |
|  | a) | Mean voltage | b) | Peak voltage |
|  | c) | Root mean voltage | d) | Root mean square voltage |
| 19. | In an ideal transformer, the voltage is stepped down from 11 kV to 220 V. If the primary current be 100 A, the current in the secondary should be |
|  | a) | 5 kA | b) | 1 kA | c) | 0.5 kA | d) | 0.1 Ka |
| 20. | If an $8 Ω$ resistance and $6 Ω$ reactance are present in an ac series circuit then the impedance of the circuit will be |
|  | a) | 20 $ohm$ | b) | 5 $ohm$ | c) | 10 $ohm$ | d) | $$14\sqrt{2} ohm$$ |