

PHYSICS XII
ALTERNATING CURRENT

MM = 20
Time = 50 min

Q.1 In an A.C. circuit: $v = 300 \sin 314t$. and $i = 3 \sin(314t - \frac{\pi}{2})$.
 v is instantaneous voltage. i is instantaneous current. what is
(i) Reactance of circuit (ii) Power dissipated in the circuit. (1)

Q.2 Draw the graph showing variation of Impedance $[Z]$ of a series LCR circuit with frequency. locate the resonant frequency on the graph. (1)

Q.3. A bulb and a Capacitor are connected in series to an A.C source. How will brightness of bulb changes if frequency of A.C. is increased. Give reason. (1)

Q.4 In a series LCR circuit voltage drop across L, C, R are 20V, 20V, 40V, respectively. what is (i) Power factor of circuit (ii) Applied voltage (1)

Q.5 Derive the expression for Impedance and phase diff in a series LCR circuit OR (3)

Derive the expression for av power dissipated in LCR circuit.

Q.6 A 12Ω resistance and an inductor of $\frac{0.05}{\pi}$ H are connected in series across 130V, 50 Hz A.C. Calculate current in the circuit and potential difference across inductor. (3)

Q.7 Calculate the current drawn by primary of a transformer which steps down 200V to 20V to operate a device of 20Ω . efficiency of transformer = 80%. (2)

Q.8 when an inductor L and resistance R in series are connected to 12V, 50Hz supply, a current of 0.5A flows. Current differs in phase from voltage by $\frac{\pi}{3}$ rad. Find R (2)

Q.9. A variable frequency 230V A.C is connected across series LCR. $L = 5.0\text{H}$, $C = 80\mu\text{F}$ $R = 40\Omega$. Calculate

(i) resonant frequency (ii) Impedance at resonance (iii) Peak current at resonance. (3)

Q.10 A current of 1.1 A flows through a coil when it is connected to 110V d.c. when 110V, 50Hz a.c. is applied current is 0.5A. Calculate (i) resistance (ii) Impedance (iii) Inductance of coil (3)