

## O P JINDAL SCHOOL, SAVITRINAGAR

### ASSIGNMENT

### CLASS XII PHYSICS

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- 31 An alternating voltage of frequency  $f$  is applied across a series LCR circuit. Let  $f_r$  be the resonance frequency for the circuit. Will the current in the circuit lag, lead or remain in phase with the applied voltage when (i)  $f > f_r$ , (ii)  $f < f_r$ ? Explain your answer in each case. 2
- 32 State the underlying principle of a transformer. How is the large scale transmission of electric energy over long distance done with the use of transformers? 2
- 33 Draw two arrangements of primary and secondary windings in a transformer which arrangement will have higher efficiency and why? 2
- 34 Write one use each of: (i) step down transformer, and (ii) step-up transformer. 2
- 35 In a series LCR circuit, obtain the conditions under which (i) the impedance of the circuit is minimum, and (ii) wattless current flows in the circuit. 2
- 36 Draw the graphs showing the variations of (i) inductive reactance, and (ii) capacitive reactance, with frequency of applied voltages in ac circuit. How do the values of (i) inductive, and (ii) capacitive reactance change, when the frequency of applied voltage is tripled? 2
- 37 Define root mean square current. Also, obtain its expression. 3
- 38 You are given three circuit elements X, Y and Z. When the element X is connected across an ac source of a given voltage, 3

the current and the voltage are in the same phase. When the element  $Y$  is connected in series with  $X$  across the source, voltage is ahead of the current in phase by  $\pi/4$ . But the current is ahead of the voltage in phase by  $\pi/4$  when  $Z$  is connected in series with  $X$  across the source. Identify the circuit elements  $X$ ,  $Y$  and  $Z$ .

When all the three elements are connected in series across the same source, determine the impedance of the circuit. Draw a plot of the current versus the frequency of applied source and mention the significance of this plot.

- 39 A series  $LCR$  circuit is connected to an ac source. Using the phasor diagram, derive the expression for the impedance of the circuit. Plot a graph to show the variation of current with frequency of the source, explaining the nature of its variation. 3
- 40 An inductor  $L$  of inductance  $X_L$  is connected in series with a bulb  $B$  and an ac source. How would brightness of the bulb change when (i) number of turn in the inductor is reduced, (ii) an iron rod is inserted in the inductor and (iii) a capacitor of reactance  $X_C = X_L$  is inserted in series in the circuit. Justify your answer in each case. 3