



INDIAN SCHOOL DARSAIT
DEPARTMENT OF PHYSICS



Subject : PHYSICS

ALTERNATING CURRENT

Worksheet #8

Resource Person: SUSAN ANIL

Date : 6.9.17

Name of the Student : _____

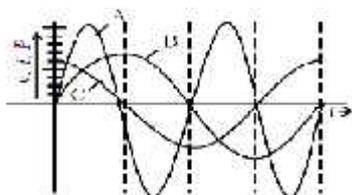
Class & Division : _____

Roll Number : ____

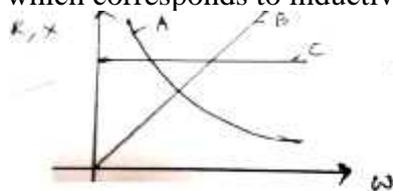
One mark questions:

1. A device 'X' is connected to an a.c. source $V = V_0 \sin \omega t$. The variation of voltage, current and power in one complete cycle is shown in the following figure.

- (i) Which curve shows power consumption over a full cycle?
(ii) Identify the device 'X'. (2016)



2. Figure shows the variation of resistance and reactance versus angular frequency. Identify the curve which corresponds to inductive reactance and resistance. (2016)



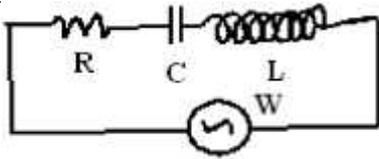
3. State which of the two, the capacitor or an inductor, tends to become a SHORT when the frequency of the applied alternating voltage has a very high value. (2015)

4. What is the power dissipated in an ac circuit in which voltage and current are given by $v = 230 \sin(\omega t + \pi/2)$ and $I = 10 \sin \omega t$.

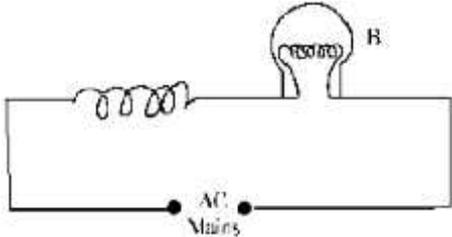
5. An electrical element X, when connected to an alternating voltage source, has the current through it leading the voltage by $\pi/2$ radian. Identify X and write an expression for its reactance.

Two marks questions:

6. In the circuit shown below, R represents an electric bulb. If the frequency of the supply is doubled, how should the values of C and L be changed so that the glow in the bulb remains unchanged? (2009)

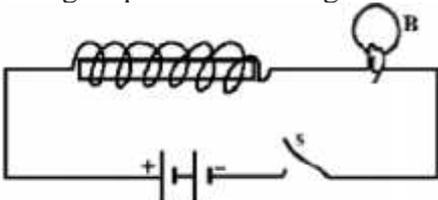


7. An air cored coil L and a bulb B are connected in series to the ac mains as shows in the given figure. The bulb glows with some brightness. How would the glow of the bulb change if an iron rod were inserted in the coil? Give reasons in support of your answer (2009)



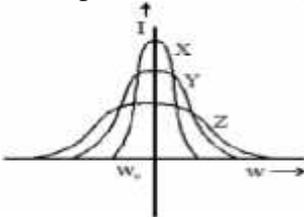
8. Fig. shows a light bulb (B) and iron cored inductor connected to a DC battery through a switch (S).

- (i) What will one observe when switch (S) is closed?
 (ii) How will the glow of the bulb change when the battery is replaced by an ac source of rms voltage equal to the voltage of DC battery? Justify your answer in each case. (2009)



Three marks questions –

9. Three students X, Y, and Z performed an experiment for studying the variation of alternating currents with angular frequency in a series LCR circuit and obtained the graphs shown below. They all used a.c. sources of the same r.m.s. value and inductances of the same value. What can we (qualitatively) conclude about the (i) capacitance value (ii) resistance values used by them? In which case will the quality factor be maximum? What can we conclude about nature of the impedance of the set up at frequency ω_0 ? (2009)



10. When a circuit element 'X' is connected across an a.c. source, a current of A flows through it and this current is in phase with the applied voltage. When another element 'Y' is connected across the same a.c. source, the same current flows in the circuit but it leads the voltage by $\pi/2$ radians.
 (i) Name the circuit elements X and Y.
 (ii) Find the current that flows in the circuit when the series combination of X and Y is connected across the same a.c. voltage.
 (iii) Plot a graph showing variation of the net impedance of this series combination of X and Y as a function of the angular frequency of the applied voltage. (2009)