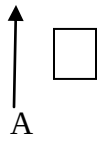
TEST SERIES XII (PHYSICS)

EMI AND AC

MT -1H **MM-30**

Q1-Two identical loops,one of copper and another of constanton,are removed from a magnetic field within the same time interval.In which loop the induced current will be greater?(1)

Q2- 

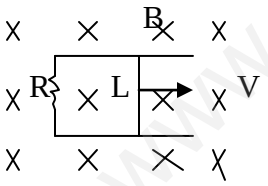
In the wire AB current is decreasing.What is the directrion of induced Current in the square loop?(1)

Q3- Define the term self inductance. Write its SI unit.(1)

Q4-Find the capacitance of the capacitor that would have the reactance of 100ohm when used with an ac source of frequency$5/\pi$ KHZ.(1)

Q5-Current and voltage in the circuit are I=10 Sin 314t and V=50 Sin $(314t + \pi/2)$V. What is the power dissipation in the circuit?(1)

Q6-A conducting rod of length l,with one end pivoted, is rotated with a uniform angular speed w in a vertical plane, normal to the uniform magnetic field B. Deduce an expression for the emf induced in this rod.(2)

Q7.- 

(A) Find the induced current in the circuit.

(B) Find the minimum force required for pulling the Sliding arm with constant speed v.(2)

Q8.An electric heater is connected ,turn by turn, to a dc and ac sources of equal voltages. Will the rate of heat production be same in two cases? Explain.(2)

Q9- Prove that in a series LCR circuit, the power dissipated depends not only on the voltage and current but also on the cosine of the phase angle Φ between these two.(2)

Q10-Prove that on applying an ac across an inductor voltage leads to current by phase $\pi/2$ radian.(2)

Q11.An alternating voltage of frequency f is applied across a series LCR circuit.Let f_r be the resonance frequency.Will the current in the circuit lag,lead or remain in phase with the applied voltage when (a)$f>f_r$ (b) $f < f_r$ Explain your answer in each case.(2)

Q12.(A) Plot a graph showing variation of current with frequency of ac source in a series LCR circuit.(B)Plot a graph showing the variation of impedence of a series LCR circuit with the frequency of applied ac source.(1+1)

Q13.When a series combination of L and R are connected with a 10v,50hz,ac source, a current of 1amp flows in the circuit. The voltage leads the current by a phase angle of $\pi/3$ radian. Calculate the value of L and R.(2)

Q14.Write the principle of transformer. Prove that in a step up transformer current decreases across the secondary .Why we transmit the power at high voltage?(2)

Q15-Write the principle and working of ac generator.(3)

Q16-(A) Derive an expression for self inductance of a coil.(2)

(B)There are two concentric loop of radius r and R (r<<R).Derive an expression for mutual inductance of the coils. (2)