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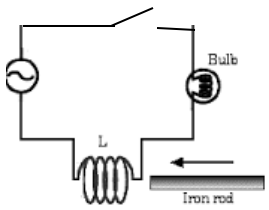
ALTERNATING CURRENT

Test Paper-II

MAX MARKS: 30 **TIME: 90Mts**

Sl. No.	QUESTION	ANSWER PAGE	MARKS
1	Show that the average power though over a completer cycle in an ac circuit consisting of capacitance is zero.	**Page:242**	2
2	A lamp is connected in series with a capacitor. Predict your observations for dc and ac connections. What happens in each case if the capacitance of the capacitor is reduced?	**Page:242**	2
3	A 15 μF capacitor is connected to a 22V, 50Hz source. Find the capacitive reactance and the current (rms and peak) in the circuit. If the frequency is doubled, what happens to the capacitive reactance and the current?	**Page:244**	2
4	A light bulb and an open coil inductor are connected to an ac source through a key as shown in fig.The switch is closed and after sometime, an iron rod is inserted into the interior of the inductor. The glow of the light bulb (a) increases; (b) de creases ;(c) is unchanged, as the iron rod is inserted. Give your answer with reasons.	**Page:244**	2



5	Discuss about an LCR circuit with the help of a phasor diagram with relevant equations for current and voltage	**Page:245**	3
6	What is meant by resonance? How it is achieved in case of an LCR circuit? Give the graph showing the variation of current with frequency. Can this condition be achieved in case of LR circuit? Explain	**Page:248**	3

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7	Give the condition at which one can allow maximum value of current through an LCR circuit. What can you say about the current for frequencies other than resonant frequency? **Page:251**	½ + ½
8	What is Q- factor of an LCR circuit? What is the role of Q-factor in measuring the sharpness of resonance? Give an expression to find the Q-factor. **Page:251**	2
9	A resistor of 200Ω and a capacitor of 15 μF are connected in series to a 220V, 50 Hz ac source. (a) Calculate the current in the circuit; (b) Calculate the voltage (rms) across the resistor and the capacitor. Is the algebraic sum of theses voltages more than the source voltage? If yes, resolve the paradox. **Page:251**	3
10	Derive an expression to find the power in an Ac circuit. What is the importance of power factor in an LC R circuit? **Page:252**	3
11	A sinusoidal voltage of peak value 283 V and frequency 50 Hz is applied to a series LCR circuit in which R= 3Ω, L=25.48mH, and C=796μF. Find (a) the impedance of the circuit ;(b) the phase difference between the voltage across the source and the current; (c) the power dissipated in the circuit; and (d) the power factor. **Page:253**	3
12	A sinusoidal voltage of peak value 283 V and frequency 50 Hz is applied to a series LCR circuit in which R= 3Ω, L=25.48mH, and C=796μF .(a)What is the frequency of the source at which resonance occurs?(b) Calculate the impedance, the current, and the power dissipated at the resonant condition. **Page:254**	3
13	At an airport, a person is made to walk through the doorway of a metal detector, for security reasons. If she/he is carrying anything made of metal, the metal detector emits a sound. On what principle does this detector work? **Page:255**	1

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