

**Time 60 Minutes**

**Marks 25**

**Instructions:**

- Q.1 to Q.3 are very short answer questions, carrying 1 mark each
- Q.4 to Q.7 are short answer questions, carrying 2 mark each
- Q.8 & Q.10 are short answer questions, carrying 3 mark each
- Q.11 is long answer question, carrying 5 mark.

- Q.1 Will induced emf be setup in geostationary satellite around earth?
- Q.2 Why do birds fly off high-tension wire when the current is switched on?
- Q.3 What is the average value of ac over a half cycle?
- Q.4 Induced current has no direction of its own. Why?
- Q.5 Lenz's law is consequence of principle of conservation of energy. Explain how?
- Q.6 Give dimensions of magnetic flux and induced emf.
- Q.7 What is meant by electromagnetic induction?
- Q.8 What is mutual induction? Two coplanar and concentric circular metal loops are of radii  $r_1$  and  $r_2$ . Find their mutual inductance?
- Q.9 Show that the power consumed in a purely capacitor circuit is zero.
- Q.9 Two inductors of self-inductance  $L_1$  and  $L_2$  are connected in [a] series [b] parallel. Find the equivalent inductance in each case.
- Q.10 Find the induced emf across metal spokes rotated in uniform magnetic field. How will it be affected when the length of the spokes is doubled or the rotation speed is halved?
- Q.11 Deduce an expression for bandwidth and Q factor of an LCR circuit. How will the Q factor changes by changing the capacitance.