312310

**23242**

**3 Hours / 70 Marks** Seat No. | | | | | | | | |

***Instructions :*** (1) All Questions are *compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

**1. Attempt any FIVE of the following :** **10**

(a) Define EMF and state its unit.

(b) State the meaning of linear and non-linear networks.

(c) Define capacitance and state its unit.

(d) State the values of permeability of free space and permeability of air.

(e) Define reluctance and reluctivity.

(f) State the expression to determine energy stored in a magnetic field.

(g) State Fleming's right hand rule.

**2. Attempt any THREE of the following :** **12**

(a) State heating effect of electric current and write any two applications of it.

(b) With a neat sketch explain the working of capacitor.

(c) Three capacitors having capacitances of 3 μF, 5 μF and 7 μF. Find total capacitance when they are connected in (i) Series (ii) Parallel.

(d) State and explain statically and dynamically induced emfs.

**3. Attempt any THREE of the following :** **12**

(a) Draw the symbol and characteristics of ideal voltage source and practical voltage source.

(b) State and explain Kirchhoff's current law.

(c) Explain the construction of a lead acid battery with neat diagram.

(d) Distinguish between electric and magnetic circuits (any four points).

**4. Attempt any THREE of the following :** **12**

(a) Calculate current, resistance and energy consumed by an electric iron rated 230 V, 2 kW when used for 12 hours.

(b) The resistance of copper coil increases from 70 Ω at 12 °C to 95.5 Ω at 60 °C. Find temperature coefficient of material at 0 °C.

(c) If 200 V source is applied to parallel combination of 3 capacitors of 4 μF, 8 μF and 12 μF. Calculate energy stored in each capacitor.

(d) State and explain Faraday's law of electromagnetic induction.

(e) List the different types of inductor with their applications.

**5. Attempt any TWO of the following :** **12**

(a) (i) State Ohm's law and express it in the form of equation.

(ii) Compare series and parallel circuits of resistance (any four points).

(b) Draw hysteresis loop for following materials :

(i) Permanent magnet

(ii) Steel alloy

(iii) Plastic

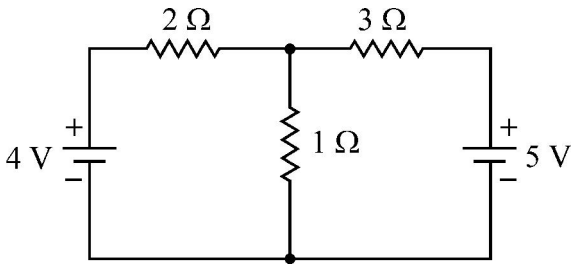
(c) An air cored coil 1.5 meter long, 8 cms. in diameter has 5000 turns then calculate :

(i) The inductance of the coil.

(ii) The magnetic energy stored when the current of 12 Amp passes through it.

**6. Attempt any TWO of the following :** **12**

(a) Find current through 1 Ω resistance using Kirchhoff's voltage law.




(b) An iron ring of mean circumference 100 cm is uniformly wound with 500 turns of wire. Calculate the value of flux density to produce a current of 1.1 Amp in the ring. Assume $\mu_r = 1200$.

(c) Derive the expression for the energy stored in magnetic field.

---