

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 $3\ \mu\text{F}$, $5\ \mu\text{F}$ and $7\ \mu\text{F}$. 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 $230\ \text{V}$, $2\ \text{kW}$ when used for 12 hours.
- (b) The resistance of copper coil increases from $70\ \Omega$ at $12\ ^\circ\text{C}$ to $95.5\ \Omega$ at $60\ ^\circ\text{C}$. Find temperature coefficient of material at $0\ ^\circ\text{C}$.
- (c) If $200\ \text{V}$ source is applied to parallel combination of 3 capacitors of $4\ \mu\text{F}$, $8\ \mu\text{F}$ and $12\ \mu\text{F}$. 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

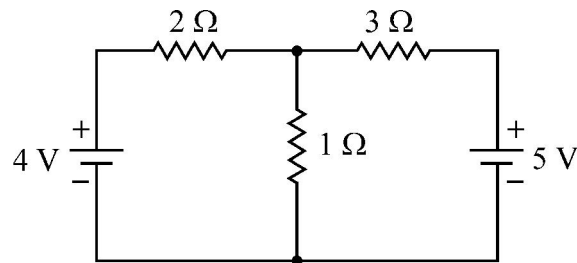
- (a)
 - (i) State Ohm's law and express it in the form of equation.
 - (ii) Compare series and parallel circuits of resistance (any four points).
- (b) Draw hysteresis loop for following materials :
 - (i) Permanent magnet
 - (ii) Steel alloy
 - (iii) Plastic

- (c) An air cored coil 1.5 meter long, 8 cms. in diameter has 5000 turns then calculate :
- The inductance of the coil.
 - 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 $1\ \Omega$ 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.
-

