

22212

23242

3 Hours / 70 Marks

Seat No.

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- 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.
 - (7) Preferably, write the answers in sequential order.

Marks

1. Attempt any FIVE of the following :

10

- (a) Define Current. State its unit.
- (b) State Ohm's law.
- (c) Define Capacitance. State its unit.
- (d) Define magnetomotive force (m.m.f.) and reluctance in magnetic circuit.
- (e) State the relation between magnetic flux density and magnetic field intensity for magnetic material.
- (f) State Lenz's law.
- (g) State any two types of inductors.



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

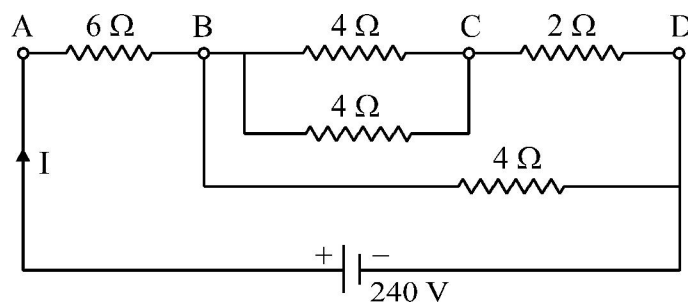
- (a) Explain with neat diagram Ideal voltage source and Ideal current source.
- (b) Distinguish between linear and non-linear circuits. State one example of each.
- (c) State the difference between breakdown voltage and dielectric strength of dielectric material. Draw the charging and discharging curves for a capacitor (C) connected to d.c. source through a resistance (R) ohm.
- (d) Derive the equation of energy stored in a capacitor.

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

- (a) State the effect of electric current observed in electric bell. State how this effect is produced.
- (b) Explain the effect of temperature on resistance of Conducting and Insulating materials.
- (c) Distinguish between unilateral circuit and bilateral circuit. State one example of each.
- (d) State any four type of capacitors with their applications.

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

- (a) An electric iron of rating 230 V, 500 W is used daily for eight hours. Calculate the number of units consumed by it in the month of 30 days. Also determine the energy charges at a rate of ₹ 7 per unit.
- (b) Calculate the equivalent resistance between point A and D. Also calculate current drawn by source.

**Figure No. 1**

- (c) Determine the current in 10Ω resistance by applying Kirchoff's laws.

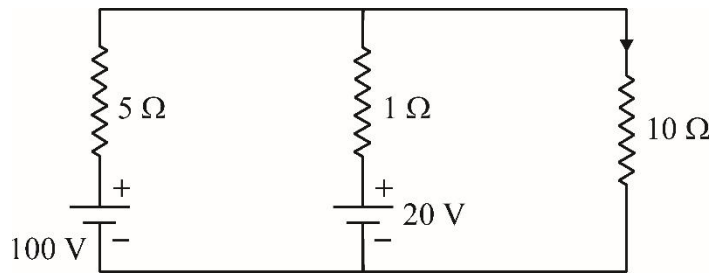


Figure No. 2

- (d) Derive the formula for equivalent capacitance ($C_{eq.}$) for three capacitors C_1 , C_2 and C_3 connected in parallel.
- (e) Three capacitors $20\ \mu\text{F}$, $30\ \mu\text{F}$ and $50\ \mu\text{F}$ are connected in parallel across $250\ \text{V d.c.}$ supply.

Calculate :

- (i) Equivalent capacitance
- (ii) Charge on $20\ \mu\text{F}$ capacitor

5. Attempt any TWO of the following :

12

- (a) Draw B-H (Mag. Flux density V/s. Mag. Field intensity) curve for magnetic and non-magnetic material. Draw Hysteresis loop for hard steel and soft steel.
- (b) An iron ring of mean circumference of $70\ \text{cm}$ and cross sectional area of $50\ \text{mm}^2$ is uniformly wound by wire of 1000 turns carrying $1.6\ \text{A}$ current. Calculate the value of flux and flux density.
(Assume $\mu_r = 1000$). Also calculate mmf and field intensity.
- (c) A coil of 1000 turns is placed in a changing magnetic field. The magnetic flux linking with the coil is changed from $0.5\ \text{mWb}$ to $0.1\ \text{mWb}$ in 0.04 second. Calculate the emf induced in it. State the nature of the induced emf.

6. Attempt any TWO of the following :

12

- (a) Compare electric circuit with magnetic circuit for any six points.

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- (b) (i) A coil has an inductance of 0.1 H. The current in the coil is changed from 10A to 5A in 0.01 sec. Calculate the emf induced in it.
- (ii) Compare statically induced emf and dynamically induced emf.
- (c) A field winding of a d.c. electromagnet is wound with 160 turns. Its resistance is 25 ohm and connected to 250 V d.c. supply. The magnetic flux produced by current in coil links to coil and is 0.007 Wb. Calculate the self inductance of the coil and energy stored in magnetic field.
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