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.

(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.

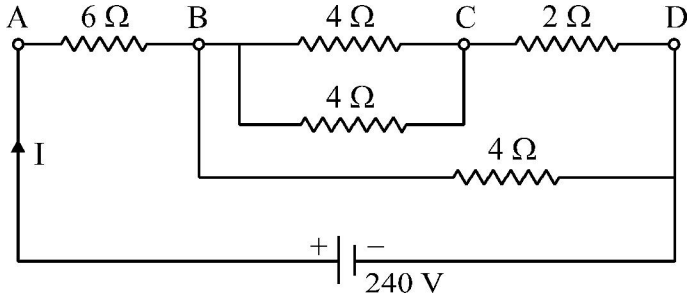

Figure No. 1

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

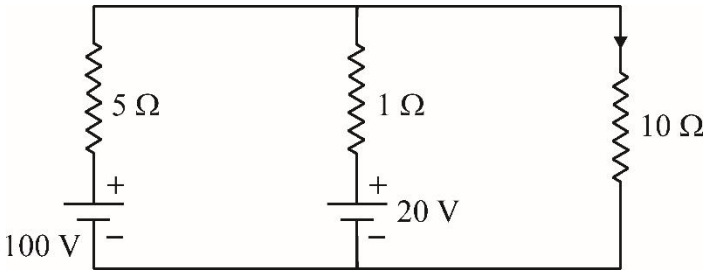

Figure No. 2

(d) Derive the formula for equivalent capacitance (Ceq.) for three capacitors C_1, C_2 and C_3 connected in parallel.

(e) Three capacitors 20 μF, 30 μF and 50 μF are connected in parallel across 250 V d.c. supply.

Calculate :

(i) Equivalent capacitance

(ii) Charge on 20 μF 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 cm and cross sectional area of 50 mm^2 is uniformly wound by wire of 1000 turns carrying 1.6 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 mWb to 0.1 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.

(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.
