12425

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) Use of Non-programmable Electronic Pocket Calculator is permissible.

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

Marks

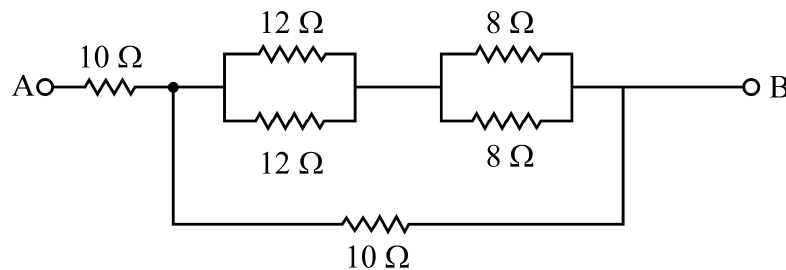**1.   Attempt any FIVE of the following :**   **10**

(a) Define conductivity & state it's unit.

(b) State Ohm's law applied to an electrical circuit & express it in the form of equation.

(c) Define dielectric strength for a capacitor and give its unit.

(d) Define the following terms :

(i) MMF

(ii) Reluctance

(e) Define Magnetic Hysteresis.

(f) State Lenz's law.

(g) List the different types of battery with its one application each.

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

(a) Draw the symbol & characteristics of Ideal Voltage Source & Practical Voltage Source.

(b) Find the equivalent resistance between terminal A & B shown in Fig. No. 1 given below :

(Fig. No. 1)

(c) Plot charging voltage and current curves of capacitor, also write expression for them.

(d) Explain Heating effect of electric current with its application.

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

(a) Describe the effect of temperature on Resistance.

(b) State and explain Kirchoff's voltage law.

(c) Three capacitors 14 μF, 16 μF and 18 μF are connected in circuit. Find equivalent capacitance when they are connected in

(i) Series

(ii) Parallel

(d) Find the current (I) flowing through 6Ω resistor shown in Figure No. 2 using KVL.
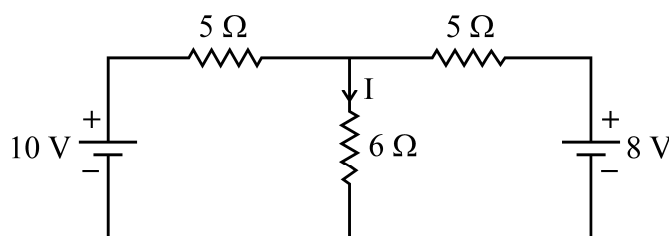
(Fig. No. 2)

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

   (a) Define electric work and electric power. Give their SI units.

   (b) Derive expression for energy stored in a capacitor with the help of neat diagram.

   (c) Explain construction of lead acid battery with neat sketch.

   (d) Draw and label series magnetic circuit and parallel magnetic circuit.

   (e) Compare statically induced emf and dynamically induced emf on following four points :

      (i) Movement of coil or magnet

      (ii) Current

      (iii) Expression of induced emf

      (iv) Application

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

   (a) Define following terms :

      (i) Active and Passive Network

      (ii) Linear and Non-linear circuit

      (iii) Unilateral and Bilateral circuit

   (b) Draw hysteresis loop for hard steel, cast steel and sheet steel, also write one application for each material.

   (c) A coil consisting of 200 turns is placed in the magnetic field of 0.6 mWb. Calculate the average emf induced in a coil when it is moved in 0.08 seconds from the given field of 0.2 mWb. If the resistance of coil is 200 Ω, find the induced current in the coil.

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

    (a) Compare Electric circuit and Magnetic circuit stating three similarities and three dissimilarities.

    (b) (i) State various types of inductor. 3

        (ii) Derive energy stored in magnetic field. 3

    (c) If a coil of 2000 turns is linked with a flux of 0.04 weber, when carrying current of 20 A

    Calculate :

    (i) Inductance of a coil

    (ii) Induced emf if current is uniformly reversed in the coil in 0.02 seconds.

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