22212

21819

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

Instructions – (1) All Questions are *Compulsory.*

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

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

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

(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 power and energy.

b) State the concept of internal voltage drop.

c) Define dielectric strength for a capacitor. And state its unit.

d) Define the term MMF and give it's unit.

e) A magnetic circuit has effective iron length of 100 cm and it is wound with 800 turns of wire carries 1 A. Find the magnetic filed strength.

f) State Lenz's law.

g) State Faraday's law of electromagnetic induction.

Marks

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

a) The rating of electric geyser is 250 V, 3 kW. How much current does it take and what is its hot resistance? Also calculate the energy consumed by it in one hour.

b) Compare series circuit and parallel circuit.

c) Draw a practical set-up to plot charging and discharging curves of capacitor through a resistor. Draw the curve.

d) State the term of co-efficient of self inductance and also prove that $L = \frac{N^2}{S}$, where N = Number of turns, S = reluctance.

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

a) The field coil of generator has 14.1 Ω at 25°C and 18.2 Ω at 32°C. Find the temperature coefficient of resistance at 0°C and resistance at 0°C.

b) Compare wire-wound resistor with carbon composition resistor on the basis of material, wattage, rating size and application.

c) Determine the current through 6 Ω resistors shown in Fig. No. 1 using KVL.

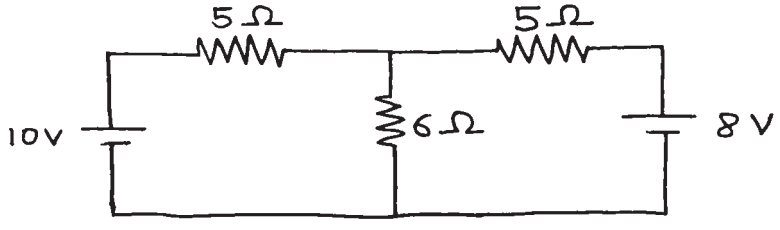

Fig. No. 1

d) Derive equation which is used for finding equivalent capacitances when three capacitances are connected in parallel.

Marks

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

a) State the laws of resistance and also the factors on which resistance of a material depends.

b) A resistance of 10 Ω is connected in parallel with 15 Ω. If current through the combination is 10 A, calculate current through each resistance.

c) Find resistance R_{AB} for the N/W shown in Fig. No. 2

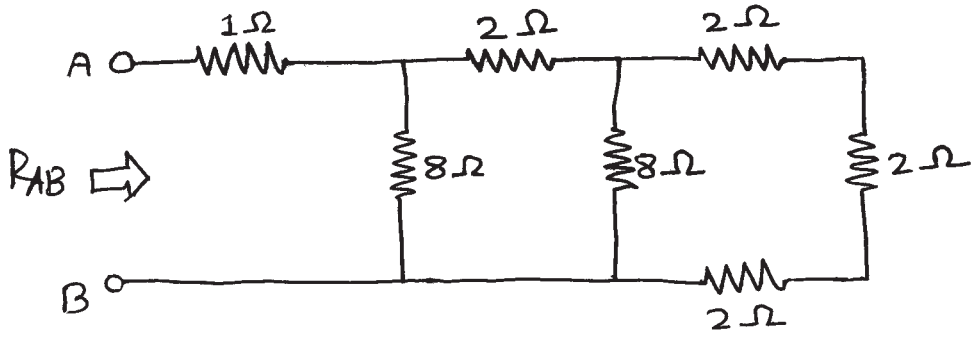

Fig. No. 2

d) Explain constant voltage charging method.

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

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

a) Compare electric circuit and magnetic circuit on any six points.

b) Draw a neat sketch of series magnetic circuit. State value of reluctance for both series and parallel magnetic circuit. Name each term used in them.

c) An air cored solenoid has a length of 60 cm and diameter of 2 cm. Calculate its inductance if it has 1000 turns and also find the energy stored in it if the current rises from zero to 6 AMP.

Marks

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

a) Draw hysteresis loop for following materials:

(i) permanent magnet

(ii) steel alloy

(iii) plastic

b) If a coil of 150 turns is linked with a flux of 0.01 wb when carrying a current of 10 A. Calculate the inductance of the coil. If this current is uniformly reversed in 0.01 seconds. Calculate the induced emf. If second coil of 100 turns is uniformly wound over first coil, find mutual inductance between the two coils.

c) (i) State the various types of inductor.

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