17214

15162

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions : (1) All Questions are *compulsory*.

(2) Answer each Section on same / separate answer sheet.

(3) Answer each next main Question on a new page.

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

(5) Figures to the right indicate full marks.

(6) Assume suitable data, if necessary.

Marks

1. Attempt any TEN of the following : **20**

(a) Differentiate between Direct current and Alternating current. (any two points)

(b) Define emf and resistance.

(c) State the different types of resistors.

(d) State Ohm's Law.

(e) State the concept of internal voltage drop.

(f) Define Capacitor.

(g) State the term Di-electric strength.

(h) State the applications of electrolytic capacitors. (any two)

(i) Draw B-H curve for magnetic curve.

(j) State the applications of electromagnet.

(k) State Lenz's law.

(l) State the different types of inductors.

(m) Write the equation of ac voltage.

(n) State the properties of good insulating materials.

P.T.O.

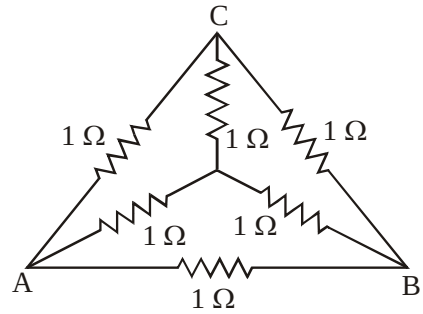
2. Attempt any FOUR of the following : **16**

(a) State the following effects of currents :

(i) Heating effect

(ii) Magnetic effect

(b) Calculate the total resistance across AB using star/delta transformation.



(c) Explain charging of a capacitor with a neat circuit diagram.

(d) Define the terms :

(i) MMF

(ii) Reluctance

(iii) Flux density

(iv) Permeance

(e) A coil consisting of 120 turns is placed in the magnetic field of 0.8 mub. Calculate the average emf induced in the coil when it is moved in 0.08 seconds from the given field of 0.3 mub. If the resistance of coil is 200 Ω, find the induced current in the coil.

(f) Compare dry cell and liquid cell on basis of principle of operation, cost, life and maintenance.

3. Attempt any four : **16**

(a) Describe duality between series and parallel electrical circuit.

(b) Three capacitors having capacitance of 4 μF, 6 μF and 8 μF respectively. Find the equivalent capacitance when they are connected in (i) series (ii) parallel.

(c) Explain Hysteresis loop of magnetic material with neat diagram.

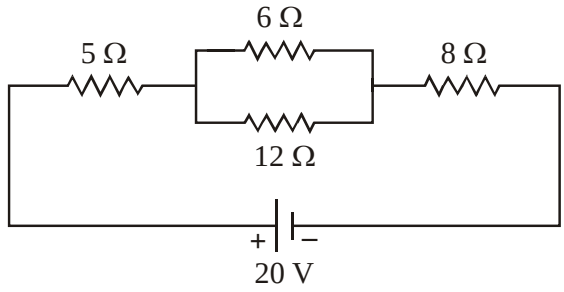
(d) State Faraday's first law and second law of Electromagnetic Induction.

(e) Define the terms cycle, frequency, time and amplitude.

(f) Classify insulating materials on the basis of temperature withstanding ability with their limiting temperature and one example.

4. Attempt any FOUR : **16**

(a)



Calculate :

(i) total equivalent resistance of circuit

(ii) Total current

(b) Define the terms :

(i) Node

(ii) Passive network

(iii) Loop

(iv) Linear circuit.

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

(d) Give any two similarities and dissimilarities between electric and magnetic circuits.

(e) Define :

(i) Self inductance

(ii) Coefficient of self induction

(f) Distinguish between paramagnetic and ferromagnetic materials with any four points.

5. Attempt any FOUR : **16**

(a) Give the classification of insulating materials on the basis of state of materials and give one application of each.

(b) Explain constant voltage charging method. (any one)

(c) Explain the term self induced emf with a neat diagram.

(d) An iron ring with mean circumference of 80 cm and cross sectional area 10 cm^2 is uniformly wound with 500 turns of wire. Determine the current required to set up a flux densitty of 1.2 Tesla in the ring. Assume μ_r = 1000 for iron.

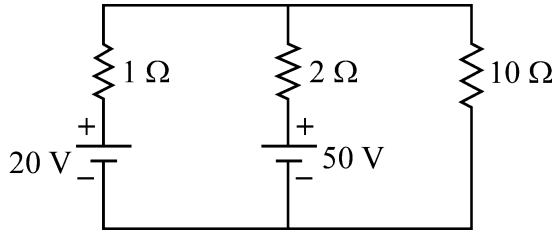
(e) Compare unilateral and bi-lateral circuit.

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

6. Attempt any FOUR : 16

(a) Define ideal voltage source and practical voltage source. Draw it's symbol and characteristics.

(b)



Using Kirchhoff's laws calculate the current flowing through 10 Ω.

(c) State Kirchhoff's current law and voltage law.

(d) (i) State Fleming's Right Hand Rule.

(ii) Define mutual inductance and state its unit.

(e) (i) Define AH efficiency and Watt-Hr efficiency of a battery.

(ii) State applications of storage batteries.

(f) State the applications of following materials :

(i) CRGO silicon steel

(ii) HRGO silicon steel

(iii) Amorphous metal

(iv) Bronze