12425

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.

Marks

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

(a) Define Faraday's First Law of electromagnetic induction.

(b) State the functions of ELCB (any two).

(c) Suggest suitable motor for following application :

(i) Food Mixer   (ii) Electric Fan

(d) List any two factors that affect Earthing.

(e) Define : MMF, Permeability.

(f) Differentiate squirrel cage and slip ring induction motor on any two parameters.

(g) List types of induced emf.

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

(a) Draw schematic of following motors. Give two applications of each :

(i)   DC shunt

(ii) DC series

(b) State the working principle of transformer. Also write the expression for EMF equation of transformer.

(c) List the main parts of DC Motor. Give the function of any two parts.

(d) Compare Electric circuit and Magnetic circuit (Any four points).

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

(a) A balanced 3 phase delta connected load consists of three resistances each of 4 Ohms connected to a 400 Volt, 3 phase, 50 Hz supply.

Find : Phase current, Line current.

(b) Define following w.r.t. alternating quantity :

(i) amplitude

(ii) frequency

(iii) peak factor

(iv) form factor

(c) State types of fuses and describe the operation of fuse.

(d) Draw schematic diagram of Split phase induction motor and explain its working.

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

(a) Draw schematic diagram of long shunt DC compound motor. Give one application.

(b) Identify material used for each of the following parts of DC Motors : Armature, Brush, Pole, Yoke, Windings.

(c) Find reluctance, flux, mmf, required and exciting current for an iron ring with 200 turns having diameter of 15 cm and 10 cm^2 cross sectional area if flux density 1 Wb/m^2 and relative permeability of 500.

(d) Explain the basic principle of operation of Brushless DC Motor.

(e) What are universal motors ? Draw schematic diagram of it.

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

    (a) 20 kVA, 3300/240 Volt, 50 Hz single phase transformer has 80 turns on secondary winding. Calculate no. of primary winding turns, full load primary and secondary currents and maximum value of flux in the core.

    (b) An alternating voltage is represented by V = 50.5 sin (314t + 90). Calculate frequency, amplitude, RMS value and phase difference.

    (c) Draw a practical set up to find voltage and current ratio on a 230/115 Volt, 1 kVA 1 phase, 50 Hz transformer. Define voltage ratio and current ratio.

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

    (a) Differentiate between fuse, and MCB on following points :

    Cost, size, rating available, switching operation after fault, maintenance and application.

    (b) Draw schematic diagram of capacitor start capacitor run induction motor. Give any two applications of the same.

    (c) For pure inductive ac circuit, draw

    (i) Circuit diagram

    (ii) Voltage and current waveforms

    (iii) Phasor diagram

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