22221

24225

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.

Marks

1. Attempt any FIVE : **10**

(a) Define the term :

(i) Magnetomotive Force

(ii) Permeability

(b) Define the power factor. State its value for purely resistive circuit.

(c) Explain the principle of operation of a d.c. motor.

(d) Explain balanced load and unbalanced load in 3ϕ.

(e) Draw circuit diagram of 1ϕ split phase I.M.

(f) Give any two application of universal motor.

(g) State the function of MCB and ELCB.

2. Attempt any THREE : **12**

(a) Differentiate between electrical circuit and magnetic circuit (Any four).

(b) Derive the EMF equation of a 1ϕ transformer.

(c) Calculate the impedance, current, active power & P.F. for a series circuit having a resistance of 10 Ω and capacitance of 100 μF fed from single phase, 200 V, 50 Hz A.C. supply.

(d) State the different types of fuses. Explain operation of fuse.

3. Attempt any THREE : **12**

(a) Draw and explain B-H curve of a magnetic material.

(b) Draw a circuit diagram of 3ϕ star connected load. Label I_{ph}, I_L, V_{ph} and V_L on it.

(c) Draw the schematic diagram of :

(i) DC shunt motor

(ii) DC series motor

(d) State the various types of earthing and explain any one type with its neat sketch.

4. Attempt any THREE : **12**

(a) Explain the concept of Dynamically and Statically induced emf.

(b) With neat sketch, explain speed control of DC shunt motor by flux control method.

(c) Draw the schematic diagram of shaded pole motor and state its principle of operation.

(d) State relation between phase and line current and voltages in balanced star and delta connection.

(e) Draw a neat sketch and explain working of any one type of stepper motor.

5. Attempt any TWO : **12**

(a) A metal-filament lamp rated at 750 watt; 100 V is to be used on a 230 V, 50 Hz supply by connecting a capacitor of suitable value in series. Determine :

(i) The capacitance required in μF.

(ii) Phase Angle

(iii) Power Factor

(iv) Apparent Power

(v) Reactive Power

(vi) Draw phasor diagram.

(b) Three similar coils each of resistance of 20 Ω and an inductance of 0.1 H are connected in star to the 3ϕ, 440 V, 50 Hz supply system. Find the phase current, line current, phase voltage, power consumed.

(c) Draw constructional sketch of DC motor, mention each part on it and state basic principle of motor.

6. Attempt any TWO : **12**

(a) A sinusoidal voltage of 48 V is applied in series with resistance of 4 kΩ. Determine I_{max}, $I_{Average}$, form factor.

(b) For a capacitor start, Induction run single phase IM :

(i) Show the schematic representation.

(ii) Explain its principles of working.

(iii) Any two applications.

(c) Compare Switch Fuse Unit (SFU) and Fuse Switch Unit (FSU).
