22232

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.

(8) Preferably, write the answers in sequential order.

Marks

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

(a) State KCL and KVL.

(b) Define : (i) Cycle (ii) Time period w.r.t. sinusoidal AC waveform.

(c) Draw Impedance triangle of R-L series A.C. Circuit.

(d) State the relation between phase and line currents in balanced delta connected system.

(e) State the working principle of D.C. motor.

(f) State the application of stepper motor (any **two**).

(g) State the types of earthing.

2. Attempt any THREE of the following : 12

(a) Compare Electric and Magnetic Circuits (any four points)

(b) Draw circuit diagram, phasor diagram, waveforms of *v* & i and impedance triangle of R – S series A.C. circuit.

(c) Explain three phase e.m.f generation.

(d) Discuss any one speed control method of D.C. shunt motor with neat circuit diagram.

3. Attempt any THREE of the following : 12

(a) State Fleming's right hand rule and Lenz's law.

(b) Derive an EMF equation of single phase transformer.

(c) Describe the procedure for reversal of rotation of D.C. shunt motor with neat diagram.

(d) Compare fuse and MCB on any four points.

4. Attempt any THREE of the following : 12

(a) State the meaning of B.H. Curve. Draw B.H. curve for Iron Material.

(b) Starter is necessary for starting of three phase induction motor. Justify the statement.

(c) Explain working of three phase induction motor.

(d) Enlist type of stepper motor and servo motor.

(e) State the concept or function of limit switch and proximity switch.

5. Attempt any TWO of the following : 12

(a) A 318 μF capacitor is connected across a 230 V, 50 Hz system. Determine :

(i) Capacitive reactance

(ii) Current

(iii) Maximum current

(iv) Maximum voltage

(v) Equation of current

(vi) Equation for voltage

(b) Three similar coils each of resistance of 15 Ω and an inductance of 0.08 H are connected in star to the 3-phase, 400 V, 50 Hz supply system. Find the phase current, line current, phase voltage, line voltage, total phase power and total line power.

(c) Explain the operation of universal motor with neat diagram. State the application of it.

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

(a) An inductance of 2 mH and a resistance of 50 Ω are connected in series across a 230 V, 50 Hz supply mains

Determine

(i) Inductive reactance

(ii) Angular frequency

(iii) Impedance

(iv) Current

(v) Circuit power

Draw circuit diagram.

(b) Describe the maintenance procedure of the FHP motors.

(c) Explain working of ELCB with neat diagram, also state general specifications of it.