17404

15162

3 Hours / 100 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 TEN of the following : **20**

(a) Define AC and DC current.

(b) Name the three types of torques required for indicating meters.

(c) Draw connection diagram of ammeter, voltmeter and wattmeter with AC supply.

(d) State two applications of d.c. series motor.

(e) Define regulation and efficiency of transformer.

(f) State the types of losses in single phase transformer.

(g) State the necessity of starter for 3 phase induction motor.

(h) Draw symbol of earthing and fuse.

(i) Write the full form of MCCB and ELCB.

(j) Write the formula to determine synchronous speed and percentage slip of induction motor.

(k) How the direction of 3 phase induction motor is reversed ?

(l) Name the electrical machines used for electro-agro system.

P.T.O.

2. Attempt any FOUR of the following : 16

(a) Write four advantages of polyphase supply systems over single phase systems.

(b) Draw single line diagram showing electrical power supply scheme.

(c) An alternating current is represented by

$i = 50.5 \sin (314 t + \pi/2)$ calculate :

(i) Amplitude

(ii) Frequency

(iii) I_{rms}

(iv) Phase difference

(d) A resistance of 10 Ω and capacitance of 50 μF are connected in series across 200 V, 50 Hz AC supply. Calculate (i) Capacitive reactance (ii) Impedance (iii) Current (iv) Phase angle

(e) Draw the circuit diagram and waveforms of voltage and current in RL series circuit.

(f) Draw a neat labelled diagram of single phase energy meter showing all its important parts.

3. Attempt any FOUR of the following : 16

(a) List the main parts of DC machine. Write the function of any two.

(b) Explain auto-transformer with step-down and step-up diagrams.

(c) Derive emf equation of single phase transformer.

(d) Draw a circuit diagram of pure inductive circuit and phasor diagram.

(e) An RL series circuit consists of 100 Ω resistance and 0.22 H inductance connected across 220 V, 50 Hz AC supply. Calculate :

(i) Impedance

(ii) Current

(iii) Voltage across resistor

(iv) Voltage across inductor

(f) A single phase 230 V/150 V, 1 kVA, 50 Hz transformer is supplied by 230 V AC supply. Find the full load primary and secondary currents.

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

(a) Explain working principle of transformer and draw neat labelled diagram.

(b) Draw and explain neat labelled diagram of stator resistance starter for starting 3 phase induction motor.

(c) Explain in brief the working of universal motor and state its applications.

(d) Write factors for selection of motor for electric drives.

(e) Compare squirrel cage and slip-ring induction motor on any four points.

(f) Explain the working of a single phase capacitor start induction motor.

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

(a) Explain the construction and working of squirrel cage rotor 3 phase induction motor.

(b) Explain the construction of alternator with neat diagram.

(c) List any four types of electric motor enclosures and state one advantage of each.

(d) A 4 pole, 50 Hz squirrel cage induction motor runs on load at a speed of 1000 rpm. Calculate :

(i) The percentage slip

(ii) The frequency of induced current in the rotor

(e) Explain the process of electroplating used in electrometallurgical system.

(f) Draw the wiring diagram for control of one lamp using two switches.

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

(a) State any four advantages of electric heating.

(b) Explain working of MCCB.

(c) State the necessity of earthing. State types of earthing.

(d) Explain the various safety precautions to be taken while handling an electric equipment.

(e) Explain with neat diagram process of any one type of electric welding.

(f) State different types of lamps. Explain any one lamp used for domestic purpose.

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