17329

11920

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

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

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

(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.

Marks

SECTION-I

1.   Attempt any NINE of the following :   **18**

(a)   Define current and voltage with their units.

(b)   Define frequency and phase.

(c)   Give any two advantages of polyphase supply.

(d)   Define kVA rating of single phase transformer.

(e)   Write types of 3ϕ Induction motor based on construction of rotor.

(f)   State the factors for selection of motor for different drives.

(g)   State the types of tariff.

(h)   State expression for active power, reactive power and apparent power for three phase circuit.

(i)   Define voltage ratio and current ratio of transformer.

(j) State the working principle of A.C. motor.

(k) State two advantages of ELCB.

(l) Name different types of safety tools.

2. Attempt any FOUR of the following : 16

(a) Define the following terms and its relation with amplitude :

   (i) RMS value

   (ii) Average value

(b) Three resistance of 30 Ω each are connected in delta across a 3ϕ 400 V AC supply. Draw the circuit. Find phase current, line current, line voltage and phase voltage.

(c) Explain construction and working principle of transformer with diagram.

(d) Define slip and slip-speed. Draw speed torque characteristics of 3 phase I.M.

(e) State applications of following lamps :

   (i) CFL lamps

   (ii) Sodium vapour lamps

(f) What is earthing ? Why it is necessary ?

3. Attempt any FOUR of the following : 16

(a) State first aid measure to be given to person who has received electric shock.

(b) Draw and explain working principle of Direct on-line starter.

(c) With neat sketch explain working of Auto transformer. List two specification of it.

(d) Describe two different types of enclosures.

(e) Derive emf equation expression of the transformer.

SECTION-II

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

   (a) Explain the working principle of UJT. State its applications.

   (b) Explain Zener diode as a voltage regulator.

   (c) Explain with diagram Op-Amp as an non-inverting amplifier.

   (d) Draw circuit diagram of full wave bridge type rectifier. Explain its operation with waveform.

   (e) Draw the circuit diagram of RC coupled amplifier and also draw its frequency response.

   (f) Convert the following :

      (i) $(416)_{10} \rightarrow ( )_2$

      (ii) $(3000.45)_{10} = ( )_8$

5. **Attempt any THREE of the following :** 18

   (a) (i) Compare between conductor and insulator. (Any three point)

      (ii) Explain working of P-N junction diode.

   (b) Draw and explain circuit of centre tapped full wave rectifier with π filter and draw its input and output waveforms.

   (c) Explain op-amp used as an adder with expression.

   (d) Design all basic gates using NOR gate only.

6. **Attempt any FOUR of the following :** $4 \times 4 = 16$

   (a) Draw symbol of

      (i) Photo-diode

      (ii) LED

      (iii) BJT

      (iv) UJT

(b) Define line and load regulation.

(c) Explain transistor as a switch with suitable circuit diagram.

(d) Draw symbol and truth table of

   (i)   EX-OR gate

   (ii) NAND gate

   (iii) OR gate

   (iv) AND gate

(e) Define Oscillator. State the conditions for sustained oscillations.

(f) Give comparison between CB, CC and CE configuration.

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