

17424

15116

3 Hours / 100 Marks

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.
- (2) Answer each Section on 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) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

SECTION - I

1. **Attempt any NINE of the following:** **18**
- a) State Ohm's law and write equation for finding current.
- b) List classification of DC motor.
- c) How single phase induction motors are made self starting?
- d) State the principle on which a transformer works.
- e) Draw neat diagram with all labelling
- (i) Stair - case wiring
- (ii) Godown wiring
- f) A battery of emf 12 volt is connected across a resistance of 10Ω , calculate the current flowing through the resistance.
- g) Compare AC supply with DC supply. (any four points)
- h) What is fuse? Explain it's function.

P.T.O.

- i) Enlist the types of wires with their applications.
- j) Give the two applications of D.C. motor.
- k) Why D.C. series motors are suitable for electric traction and cranes?

2. Attempt any FOUR of the following: 16

- a) State and explain Faraday's law of electromagnetic induction.
- b) Explain the principle of operation of a d.c. motor.
- c) Explain operating principle of 3 - phase induction motor.
- d) Define an auto - transformer. Write two advantages and applications of an auto - transformer.
- e) Explain the operation of sodium vapour lamps with neat diagram.
- f) Define:
 - (i) Turn Ratio
 - (ii) Voltage Ratio

3. Attempt any FOUR of the following: 16

- a) A resistance of $1\text{ k}\Omega$ is connected across a 12 V battery for 2 hours. Calculate the power dissipated in the resistor and energy associated with it.
- b) Explain the different methods of controlling the speed of
 - (i) a d.c. shunt motor
 - (ii) a d.c. series motor
- c) Explain resistance split - phase motor in detail.
- d) A single phase 50 Hz, 230 V/115 V, 1 kVA transformer is loaded fully, find its full load primary and secondary currents. Also find the currents at half load. Neglect losses.
- e) Describe earth leakage circuit breakers with diagram.
- f) Suggest various safety precautions which should be taken while working with electricity.

SECTION - II

4. Attempt any NINE of the following: 18

- a) Define semiconductor. Give its classification.
- b) Which type of impurities are added in pure semiconductor to obtain P - type and N - type semiconductor?
- c) State the majority and minority carriers in N - type semiconductor.
- d) Draw the symbols of following
 - (i) P - N junction diode
 - (ii) Zener diode
 - (iii) Fixed inductor
 - (iv) Fixed capacitor
- e) Draw the symbol of NPN transistor and draw its construction.
- f) State any four applications of BJT.
- g) State the need of filter in regulated power supply.
- h) Draw the circuit diagram of full wave bridge rectifier.
- i) State the different types of filters used in regulated power supply.
- j) Draw the logic symbol of AND and NAND gates.
- k) State the truth table of OR gate.
- l) State Commutative and Associative laws of Boolean algebra.

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

- a) Describe forward and reverse biasing of P - N junction diode. State its two applications.
- b) Describe the working principle of SCR with the help of neat sketch. Draw its V - I characteristics.
- c) Describe the working principle of light emitting diode. State its two applications.
- d) Draw the circuit diagram of CE configuration. Plot its output characteristics.
- e) Describe the working of centre tap full wave rectifier with its input and output waveforms.
- f) Prove following De - Morgan's theorem with the help of truth table:
 - (i) $\overline{A + B} = \overline{A} \cdot \overline{B}$
 - (ii) $\overline{A \cdot B} = \overline{A} + \overline{B}$

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

- a) Describe the working of TRIAC with the help of neat sketch. Plot its V - I characteristics.
 - b) State two applications of resistor, inductor and capacitor.
 - c) Explain the working of NPN transistor with neat diagram.
 - d) Draw the complete block diagram of regulated power supply, with necessary waveforms at each stage.
 - e) Describe the working of half wave rectifier with input and output waveforms.
 - f) Draw the symbol of EX - OR and EX - NOR gates and write its truth - table.
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