

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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