2025

M.Sc. 1st Semester Examination

ELECTRONICS

Paper : ELCC402X8

[Digital System Design]

(Practical)

Full Marks : 25 Time : Two Hours

Answer any ***one*** question by lucky draw.

1. Design and implementation of a half adder circuit.

   (a) Draw the logic diagram of the designed circuit using NAND or NOR gates.

   (b) Construct the truth table for the half adder.

   (c) Implement the circuit using appropriate ICs and verify the output for all possible input combinations.

2. Design and implementation of a full adder circuit.

   (a) Draw the logic diagram of the designed circuit using NAND or NOR gates.

   (b) Construct the truth table for the full adder.

   (c) Implement the circuit using appropriate ICs and verify the output for all possible input combinations.

3. Design and implementation of a 4 : 1 multiplexer circuit.

   (a) Draw the logic diagram of the designed circuit.

   (b) Construct the truth table for the 4 : 1 mux.

   (c) Implement the circuit using appropriate ICs and verify the output for all possible input combinations.

4. Design and implementation of a 1 : 4 demultiplexer circuit.

   (a) Draw the logic diagram of the designed circuit.

   (b) Construct the truth table for the 1 : 4 demux.

   (c) Implement the circuit using appropriate ICs and verify the output for all possible input combinations.

5. Design and implementation of a 2-bit magnitude comparator circuit.

   (a) Draw the logic diagram of the designed circuit.

   (b) Construct the truth table.

   (c) Implement the circuit using appropriate ICs and verify the output for all possible input combinations.

6. Design and implementation of a 4-bit binary to Gray code converter.

   (a) Draw the logic diagram of the designed circuit.

   (b) Construct the truth table.

   (c) Implement the circuit using appropriate ICs and verify the output for all possible input combinations.

7. Design and implementation of a JK flip-flop.

   (a) Draw the logic diagram of the designed circuit.

   (b) Construct the truth table.

   (c) Implement the circuit using appropriate ICs and verify the output for all possible input combinations.

8. Design and implementation of a 2-bit synchronous counter circuit.

   (a) Design the logic diagram of the counter circuit.

   (b) Construct the state table.

   (c) Implement the circuit using appropriate ICs and verify the output states.

9. Design and implementation of a shift register.

   (a) Draw the logic diagram of the designed circuit.

   (b) Construct the state table.

   (c) Implement the circuit using appropriate ICs and verify the output.

10. Design and implementation of a 4-bit R-2R ladder circuit.

    (a) Draw the circuit diagram.

    (b) Implement the circuit.

    (c) Obtain the output voltage when 1000 input is applied to the circuit.

Evaluation Marks Distribution :

Laboratory Notebook	5
Viva-voce	5
Experiment	15
Total	25