

2025

M.Sc. 1st Semester Examination

ELECTRONICS

Paper : ELCC402X1

[Digital System Design]

Full Marks : 25

Time : One Hour

*The figures in the margin indicate full marks.
Candidates are required to give their answers
in their own words as far as practicable.*

Group - A

Answer any *two* questions : $2 \times 2 = 4$

1. Using 4 : 1 MUX, implement the logic function
 $F(A, B, C) = \sum m(1, 2, 4, 7)$.
2. Design a half adder circuit using NAND gates only.
3. Prove that $A + BC = (A + B)(A + C)$.
4. Differentiate between latch and flip-flop.

Group - B

Answer any *two* questions : $4 \times 2 = 8$

5. Reduce using mapping the expression
 $f = \sum m(0, 1, 2, 3, 5, 7, 8, 9, 10, 12, 13)$.

P.T.O.

(2)

6. Design a 2-bit synchronous counter and mention its different states using timing diagram. 2+2
7. What is a Mealy machine? Draw the block diagram of a Mealy machine and explain how the output depends on the present state and the input. 1+1+2
8. Design a 4-bit binary to Gray code converter circuit.

Group - C

Answer any *one* question : 8×1=8

9. Convert JK flip-flop to T flip-flop. What is race around condition? How it can be avoided? 4+2+2
10. (a) A 6-bit DAC has a full-scale output of 10 V.
 - (i) Calculate the resolution in volts.
 - (ii) Find the percentage resolution.
- (b) Write short note on successive approximation type A/D converter. 1+1+6

Internal Assessment : 5 marks
