VIT

Vellore Institute of Technology

SCHOOL OF ELECTRONICS ENGINEERING
CONTINUOUS ASSESSMENT TEST - II
FALL SEMESTER 2024-2025

REG.NO.:

SLOT: E1+TE1

Programme Name & Branch : **B.Tech -CSE**

Course Code and Course Name : **BECE102L & Digital Systems Design**

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Class Number(s) : VL2024250104311, VL2024250104284, VL2024250104278, VL2024250104266, VL2024250104273, VL2024250104287, VL2024250104292, VL2024250104293, VL2024250104269, VL2024250104256, VL2024250104299, VL2024250104264, VL2024250104297, VL2024250104262, VL2024250104310, VL2024250104276, VL2024250104271, VL2024250104252

Date of Examination : **17-Oct-2024**

Exam Duration : **90 minutes** **Maximum Marks: 50**

General instruction(s):

- Answer All Questions

Questions

1. Design a Priority Encoder which has 4 inputs, the case in which the priority order is D2>D0>D3>D1 (D2 is the highest Priority and D1 is the Lowest priority). Write the Verilog code for the same using behaviour level modelling. 10

2. Assume that registers M and Q of the sequential Booth's multiplier are initialized with the values - 15 and 7. 10

   1) Perform the multiplication operation according to Booth's algorithm.

   2) After multiplication, how many subtraction and addition operations will be performed? Write the answer in decimal.

3. Obtain the Boolean expressions (A>B, A=B and A<B) for 3-bit magnitude comparator. Based on the comparison, develop a control network to perform the following operation in block diagram level. 10

   a. If A=B, Perform binary addition

   b. If A>B, Perform array multiplication

   c. If A<B, Perform two complement subtraction

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4. A M-F flip-flop behaves as follows: 10

If MF = 01, the flip-flop changes state.

If MF = 11, the flip-flop is set to Q = 0.

If MF = 00, the flip-flop is set to Q = 1.

The input combination MF = 10 is not allowed.

(a) Give the characteristic (next-state) equation for this flip-flop.

(b) Complete the table, using don't-cares where possible.

Q	Q^+	M	F
0	0		
0	1		
1	0		
1	1		

(c) Realize the following next-state equation for Q using a MF flip-flop:

$Q^+ = CQ + D\bar{Q}$. Find equations for M and F.

5. Using positive edge triggering SR flip flop, design a synchronous counter which counts the following sequence 10

000, 111, 110, 101, 100, 011, 010, 001, 000

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