CBCS SCHEME

USN | | | | | | | | | | |

17EC34

Third Semester B.E. Degree Examination, June/July 2023
Digital Electronics

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Place the given equations into proper canonical form:

(i) $P = f(a, b, c) = a\bar{b} + \bar{a}c + abc$

(ii) $S = f(x, y, z) = \bar{x}y + xz + \bar{y}z$ **(08 Marks)**

b. For a given truth-table, write the SOP and POS expressions and design logic circuit for both. (Refer Truth table of Fig.Q1(b)) **(08 Marks)**

Input			Output
a	b	c	y
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	0

Fig.Q1(b) : Truth Table **(04 Marks)**

OR

2 a. Simplify $y = f(a, b, c, d) = \sum(1, 3, 5, 6, 8, 10, 12) + d(0, 4, 7, 14)$ using K-map method and draw the logic circuit for obtained expression using NAND gates. **(10 Marks)**

b. Simplify $y = f(a, b, c, d) = \sum m(0, 1, 2, 4, 6, 8, 9, 12, 14)$ using QM method. Verify using K-map technique. **(10 Marks)**

Module-2

3 a. Using a 2 to 4 decoder IC-74LS139, realize a Boolean function $S = f(a, b) = \sum(0, 1, 3)$. **(06 Marks)**

b. Realize the function $T = f(w, x, y, z) = \sum(1, 3, 4, 6, 7, 9, 10, 13)$ using 8:1 Mux. **(06 Marks)**

c. Design 2-bit binary comparator. **(08 Marks)**

OR

4 a. Realize Decimal to BCD priority encoder. **(10 Marks)**

b. Realize the Boolean function $F = f(a, b, c) = \sum(0, 2, 4, 5, 7)$ using 8:1 Mux. **(10 Marks)**

Module-3

5 a. Explain the operation of SR-Flip-Flop with the help of functional table and logic diagram. **(08 Marks)**

b. What is race-around condition? Explain with logic diagram. **(06 Marks)**

c. Obtain the characteristic table and characteristic equation for JK-Flip-Flop. **(06 Marks)**

OR

6 a. Explain the working of Master – Slave JK Flip-Flop with the help of logic diagram. **(08 Marks)**

b. Explain the working of positive edge triggered D-Flip-Flop with the help of logic symbol and function table. **(08 Marks)**

c. Write the difference between latch and flip-flop. **(04 Marks)**

Module-4

7 a. What is register? Explain 4-bit serial-in serial-out unidirectional shift register with the help of diagram. **(10 Marks)**

b. Explain 4-bit Asynchronous up and down counter. **(10 Marks)**

OR

8 a. Explain 3-bit up/down counter using mode-control input. **(10 Marks)**

b. Design MOD-5 synchronous counter using JK-flip-flops. **(10 Marks)**

Module-5

9 a. What are Mealy and Moore models? Explain. **(10 Marks)**

b. Design 2-bit synchronous counter. **(10 Marks)**

OR

10 a. Write state table and state diagram with an example. **(10 Marks)**

b. Give Excitation table and equations for T-flip flop and explain the operation. **(10 Marks)**

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