Faculty of Science & Technology

First Semester B.Tech. (ET in ET) (Common) (NEP) (AI/AIDS/AIML/RoAI/I IOT)

2024-2025 Examination

DIGITAL CIRCUITS & LOGIC DESIGN

Time : Three Hours] [Maximum Marks : 70

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Solve Question No. 1 **OR** Question No. 2.

(3) Solve Question No. 3 **OR** Question No. 4.

(4) Solve Question No. 5 **OR** Question No. 6.

(5) Solve Question No. 7 **OR** Question No. 8.

(6) Solve Question No. 9 **OR** Question No. 10.

(7) Due credit will be given to neatness and adequate dimensions.

(8) Assume suitable data whenever necessary.

(9) Illustrate your answers whenever necessary with the help of neat sketches.

1. (a) Explain different types of gates used in digital systems. 7

(b) Simplify using K-map and realize using gates :

$f(A, B, C, D) = \Sigma m (0, 1, 4, 5, 9, 11, 14, 15) + \Sigma \varphi (10, 13)$. 7

OR

2. (a) Explain and prove De-Morgan's Theorem. 6

(b) Solve the following :

(i) $(1101.11)_2 = (\ )_{10}$

(ii) $(12.625)_{10} = (?)_2$

(iii) $(356)_{10} = (?)_8$

(iv) $(5352.4051)_8 = (?)_{10}$ 8

3. (a) Implement a Full Adder using two Half Adder and OR gate. 7

(b) Design a 4 bit BCD adder. 7

OR

4. (a) Implement 1 : 16 De multiplex using two 1 : 8 de multiplexers. 7

(b) Implement the following function using 8 : 1 multiplexer :

$F = \Sigma m (0, 1, 2, 3, 11, 12, 14, 15)$. 7

5. (a) Draw and explain Master Slave JK flip flop. 6

(b) Convert :

(i) JK flip flop to T flip flop

(ii) JK flip flop to D flip flop. 8

OR

6. (a) What do you mean by Race around condition in JK flip flop ? How this condition can be overcome ? 7

(b) Draw and Explain D type flip flop. 7

7. (a) Differentiate between Synchronous & Asynchronous counters. What do you mean by a modulus of counter ? 7

(b) Design a 4 bit up/down asynchronous counter circuit. 7

OR

8. (a) Explain Serial Input Parallel Output (SIPO) Shift Register. 7

(b) Differentiate between Mealey and Moore Machines. 7

9. (a) Write a note on PAL. 7

(b) Write a note on Dynamic memories. 7

OR

10. (a) Write a note on Optical Disk. 7

(b) Write a note on Static Memories. 7

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