C **Reg. No. :** | | | | | | | | | | | | |

Question Paper Code: U2E05

B.E./B.Tech. DEGREE EXAMINATION, MAY 2024

Second Semester

Artificial Intelligence & Data Science

21UAD205- Digital Logic Design

(Regulations 2021)

Duration: Three hours Maximum: 100 Marks

Answer All Questions

PART A - (5x 1 = 5 Marks)

1. Conversion of decimal number 5610 to it's binary number equivalent is CO1- R

   (a) 1100112 (b) 110011102 (c) 1110002 (d) 111112

2. How many full adder required to design 4 bit binary parallel adder CO2- R

   (a) 1 (b) 2 (c) 3 (d) 4

3. Which of the following flip-flops is free from the race around the CO1- R
   blem?

   (a) T flip-flop (b) SR flip-flop (c) Master-Slave Flip-flop (d) flip-flop

4. In synchronous circuit , the present state is determined by CO1- R

   (a) unclocked flip-flops (b) clocked flip-flops (c) flip-flops (d) latches

5. For programmable logic functions, which type of PLD should be used? CO1- U

   (a) PLA (b) PAL (c) CPLD (d) SLD

PART – B (5 x 3= 15 Marks)

6. Subtract the following 11011-11001 using 2's complement CO3- App

7. Write the gray code and excess -3 code for the binary code 1010 CO3- App

8. Define Priority encoder with truth table and circuit CO1- R

9. List the basic types of shift registers in terms of data movement. CO1- R

10. Given F (A, B, C) =∑m (1, 5, 6, 7). CO3- App

Realize the hazard free circuit for the above function.

PART – C (5 x 16= 80 Marks)

11. (a) Design K map and minimize using K map method. Implement it using NAND gates CO3-App (16)

F(A,B,C,D) = π (0,1,4,5,6,8,9,12,13,14)

Or

(b) Reduce the following equation using Quine McClucky method of minimization CO3-App (16)

F (A,B,C,D) = m(0,1,3,4,5,7,10,13,14,15)

12. (a) Design a circuit for parallel addition and subtraction CO3-App (16)

Or

(b) Design a circuit for priority encoder CO3-App (16)

13. (a) Using SR flip flops, design a parallel counter which counts in sequence CO3-App (16)

000,111,101,110,001,010,000 …….

Or

(b) Design MOD-10 Synchronous counter using JK flip-flops. ∀ execution table and State table CO3-App (16)

14. (a) Give hazard– free realization for the following Boolean function CO3-App (16)

f(A,B,C,D) =π (0,2,6,7,8,10,12)

Or

(b) Give hazard– free realization for the following Boolean function CO3-App (16)

f(A,B,C,D) =π (3,4,7,8,9,12,15)

15. (a) Explain in detail about the classification of memories with neat diagram? CO3-App (16)

Or

(b) Implement the following functions using PLA. CO3-App (16)

F1 (A, B, C) = Σm (1, 2, 4, 6)

F2 (A, B, C) = Σm (0, 1, 6, 7)

F3 (A, B, C) = Σm (2, 6)