C

Reg. No. :

Question Paper Code: U2E05

B.E./B.Tech. DEGREE EXAMINATION, MAY 2022

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. In which code the successive code characters differ in only one bit position? CO1- R

   (a) gray code (b) excess 3 code

   (c) 8421 code (d) algebraic code

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 oblem? CO1- R

   (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. State and prove Demorgan's theorem CO1- R

7. Differentiate Half and Full adder CO2- U

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. Define fundamental mode asynchronous sequential circuit CO1- R

PART – C (5 x 16= 80 Marks)

11. (a) Determine the SOP and POS forms of F= (0, 2, 6, 8, 10, 12, 14, 15) using k-map CO3-App (16)

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) Differentiate full sub tractor and full adder and design a full adder using NAND gate alone CO3-App (16)

Or

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

13. (a) Explain the operation of JK flip-flops with suitable diagrams? CO3-App (16)

Or

(b) Using SR flip flops, design a parallel counter which counts in the sequence 000,111,101,110,001,010,000 ……. 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 Static and dynamic RAM 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)