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

Question Paper Code: R2I04

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

Second Semester

CSE (Internet of things)

R21UIO204- DIGITAL SYSTEM AND DESIGN

(Regulations R2021)

Duration: Three hours Maximum: 100 Marks

Answer All Questions

PART A - (10 x 1 = 10 Marks)

1. The 2's complement of 17 is _____ CO2-App

   (a) 01110 (b) 01111 (c) 11110 (d) 10001

2. The minterm is also known as _____ CO1-U

   (a) SOP (b) POS

   (c) Hybrid (d)Both SOP and POS

3. The simplified expression of full adder carry is _____ CO1-U

   (a) c = xy+xz+yz (b) c = xy+xz (c) c = xy+xz+yz (d) c = xy+yz

4. Convert Gray code 1110 to binary_____ CO2-App

   (a) 1011 (b) 1111 (c) 1011 (d) 1111

5. The logic circuits whose outputs at any instant of time depends only on the present input but also on the past outputs are called _____ CO1-U

   (a) Combinational circuits (b) Sequential circuits

   (c) Latches (d) Flip-flops

6. In magnitude comparator ,If two numbers are not equal then the binary value will be CO2-App

   (a) 0 (b) 1 (c) 2 (d) 3

7. The table that is not a part of the asynchronous analysis procedure is _____ CO1-U

   (a) transition table (b) state table

   (c) low table (d) Excitation table

8. Time delay device is the memory element of CO1-U

(a) Unclocked flip-flops (b) clocked flip-flops

(c) synchronous circuits (d) asynchronous circuits

9. Which of the following has the lowest access time? CO1-U

(a) Registers (b) Main Memory (c) ROM (d) Both a and b

10. SPLDs, CPLDs, and FPGAs are all which type of device? CO1-U

(a) PAL (b) PLD (c) EPROM (d) SRAM

PART – B (5 x 3= 15 Marks)

11. Convert the following Binary numbers into Decimal numbers: CO2-App

(i) 110101_2

(ii) 1100.1011_2

12. Convert gray code 101011 into its binary equivalent CO2-App

13. Outline on shift register counters? List any two widely used shift register counters. CO1-U

14. Compare synchronous and asynchronous circuit? CO1-U

15. Compare the features of PAL and PLA CO1-U

PART – C (5 x 15= 75 Marks)

16. (a) Apply theorems and properties and simplify the Boolean expression CO2-App (15)

(i) $\overline{AC} + ABC + A\bar{C}$ (5 Marks)

(ii) $A\bar{B} + ABD + AB\bar{D} + \bar{A}\bar{C}\bar{D} + \bar{A}B\bar{C}$ (5 Marks)

(iii) $BD + BC\bar{D} + A\bar{B}\bar{C}\bar{D}$ (5 Marks)

Or

(b) Simplify the following function using tabulation method. Implement it using simple logic gates CO2-App (15)

$F(A,B,C,D)=\sum m(1,4,6,7,8,9,10,11,15)$

17.	(a)	Design a carry look-ahead adder with necessary diagrams.	CO2-App	(15)
		Or		
	(b)	Design a logic circuit to convert the 8421 BCD to Excess-3 code	CO2-App	(15)
18.	(a)	Draw the excitation table, Logic diagram and K-map for the following flip-flop conversion: a. SR flip-flop to JK flip-flop b. JK flip-flop to SR flip-flop c. D flip-flop to JK flip-flop	CO2-App	(15)
		Or		
	(b)	Design and explain about 1-Bit and 2-Bit Comparator.	CO2-App	(15)
19.	(a)	Develop Verilog program for full adder using structural model	CO2-App	(15)
		Or		
	(b)	An asynchronous sequential circuit is described by the following excitation and output function: $Y = X_1X_2 + (X_1 + X_2)Y,$ $Z = Y$ (i) Draw the logic diagram of the circuit (ii) Derive the transition table and output map (iii)Describe the behaviour of the circuit	CO2-App	(15)
20.	(a)	(a) Write short notes on EPROM and EEPROM. (8 Marks) (b) Give the classification of Semiconductor memories (7Marks)	CO1-U	(15)
		Or		
	(b)	Explain in detail about FPGA and also the types of FPGA.	CO1-U	(15)