Reg. No. : | | | | | | | | | | | | |

Question Paper Code: U2804

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

Second Semester

Information technology

21UIT204- DIGITAL PRINCIPLES & SYSTEM DESIGN

(Regulations 2021)

Duration: Three hours | Maximum: 100 Marks

Answer All Questions

PART A - (10x 2 = 20 Marks)

1.	List the types of number system by stating its base value	CO1- U
2.	Convert the following Binary numbers into Decimal numbers: (i) 110101_2 (ii) 1100.1011_2	CO2- App
3.	Illustrate OR gate with its truth table and diagram	CO2- U
4.	Realize the logic expression $Y=\overline{BC} + \overline{AC} + \overline{AB}$ using basic gates	CO2- App
5.	Write short notes on Multiplexers and Demultiplexers.	CO1- U
6.	Outline on Encoder and Decoder	CO1- U
7.	Outline about sequential circuits	CO1- U
8.	Explain Latch	CO1- U
9.	Explain about race condition	CO1- U
10.	Explain about State Table	CO1- U

PART – B (5 x 16= 80Marks)

11.	(a)	Develop a truth table for BCD adder, retrieve the Cout expression using K-Map, construct a 4-bit BCD adder logic diagram and Analyse the circuit by passing input value 1010 and a carry ‘1’.	CO3-Ana	(16)

Or

	(b)	Convert the Binary inputs B0,B1,B2,B3 to its corresponding Gray code outputs G0,G1,G2,G3. Develop a truth table ,reterive the expressions using K-Map, construct a logic diagram and Analyse the circuit by passing input value 1001.	CO3-Ana	(16)
12.	(a)	Analyze and simplify the logical expression $ABCD + \overline{A}\,\overline{B}\,\overline{C}\,D + \overline{A}\,B\,C + AB$ and construct a 4-variable K-Map. Obtain the simplified expression from the map	CO3-Ana	(16)
		Or		
	(b)	Analyze and simplify the Boolean function using Quine-McMcluskey Method: $F(a,b,c,d) = \sum m(0,2,3,6,7,8,10,12,13)$	CO3-Ana	(16)
13.	(a)	Construct the truth table and build a circuit diagram, Derive Boolean expression by applying the logic of Half adder and Full Adder	CO2-App	(16)
		Or		
	(b)	Construct the truth table with block diagram and build a circuit diagram for Octal to Binary Encoder	CO2-App	(16)
14.	(a)	Construct an S-R Latch with input values S,R,Qn that starts from 000 to 111 and retrieve the next state using NAND gate with its logic diagram and truth table	CO2-App	(16)
		Or		
	(b)	Construct a S-R Flip-Flop with 2-bit input values 00,01,10 & 11 and reclaim its states necessary logic diagram	CO2-App	(16)
15.	(a)	Summarize on Race free assignments in detail	CO1- U	(16)
		Or		
	(b)	Infer on Analysis and design procedures of synchronous sequential circuits	CO1- U	(16)