R20 Regulation *Subject code: 3P3FA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech III Semester Supplementary Examinations, July 2024

DIGITAL LOGIC DESIGN

(Information Technology)

Maximum Marks: 70 Date:23.07.2024 **Duration: 3 Hours**

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 questions.
4. Each question carries 10marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		CO	Bloom Tx
1	What is Gray code?	1	L1
2	Convert the following numbers with the given radix to decimal. I) 61_8 ii) $A2_{16}$.	1	L1
3	Prove that NAND gates are universal gates.	2	L1
4	What is mean by minterm and maxterm?	2	L1
5	Write the differences between combinational and sequential circuits.	3	L1
6	Define Decoder? List out the applications of it?	3	L1
7	Write truth table of SR flipflop.	4	L1
8	Compare asynchronous and synchronous counters.	4	L1
9	Explain capabilities of finite state machine.	5	L1
10	Explain concept of minimal cover table.	5	L1

Part-B

Answer all the questions (10X 5M=50Marks)			
11	a) Convert the gray number 101101 into decimal, hex, octal. [5] b) Perform the subtraction in BCD using 9's complement method for 592.6-887.9 [5]	1	L2
	OR		
12	Generate hamming code sequence for given 11-bit message 01101110101. [10]	1	L2
13	a) Minimize the following expression using K-map and realize using NAND Gates. F (A,B,C,D) = $\sum$m (0,1,2,9,11) +d(8,10,14,15) [5] b) Minimize the following expression using K-map and realize using NOR Gates. F = π M(0,4,6,7,8,12,13,14,15). [5]	2	L2
	OR		
14	a) Simplify the following Boolean expressions using the Boolean theorems. (i) (A+B+C) (B'+C) + (A+D) (A'+C) (ii) (A+B) (A+B') (A'+B) [5] b) Why a NAND and NOR gates are known as universal gates? Simulate all the basic Gates. [5]	2	L2
15	a) Explain the differences between a MUX and a DEMUX. [5]	3	L2

	b) Realize 16-input multiplexer by cascading of two 8-input multiplexers. [5]		
	OR		
16	Design 2-bit digital comparator and explain with neat sketch. [10]	3	L2
17	What is meant by Edge triggered? Differentiate SR-FF and JK-FF with their functional operation and excitation tables. [10]	4	L2
	OR		
18	Design a mod-12 Ripple counter using T flip flops and explain its operation. [10]	4	L2
19	Explain about sequential circuits, state table and state diagram. [10]	5	L2
	OR		
20	Explain about Mealy machine with circuit diagram. [10]	5	L2