



R22 Regulation

Subject code:4E3DB

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Semester Regular/Supplementary Examinations, December 2024

Digital Logic Design

(Electronics and Communication Engineering)

Maximum Marks: 60

Date:04.12.2024

Duration: 3 hours

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

Part-A		CO	Bloom Tx
All the following questions carry equal marks (10X1M=10 Marks)			
1.a)	Convert (10110) ₂ to Gray code.	1	2
b)	What are 2's complement of a numbers? Give one example.	1	2
c)	Implement OR gate using NAND gates only.	2	3
d)	What is the use of don't care combinations?	2	2
e)	Write the functions of a decoder and multiplexer.	3	2
f)	Write the truth table of full adder.	3	2
g)	Define a sequential circuit and give its block diagram.	4	1
h)	Show the excitation table of JK flip flop.	4	2
i)	List out different counters.	5	2
j)	What is the difference between synchronous and asynchronous counters?	5	2
Part-B		CO	Bloom Tx
Answer All the following questions. (5X10M=50Marks)			
2	a) Convert and analyse the following [5M] i) $(67.328)_{10}$ to $(?)_2$ ii) $(3EB9)_{16}$ to $(?)_2$ iii) $(2527.347)_8$ to $(?)_2$	1	3
	b) Evaluate the decimal subtraction in 8-4-2-1 BCD using 9's complement i) Subtract 21 from 69 ii) Subtract 621 from 854. [5M]		3
OR			
3	a) Explain various number systems and codes and their conversion with examples for each. [5M] b) Interpret the following numbers in decimal : $(10110.0101)_2$, $(8A16.526)_{16}$ & $(2586.214)_8$. [5M]	1	3
4	Evaluate the simplified expression in sum of products for the following Boolean functions using K maps and draw the logic diagram. a) $F(A,B,C,D) = \Sigma(0,2,3,6,7,12,13,14,15)$. [5M] b) $F(A,B,C,D,E) = \Sigma(1,6,11,20,24)$ [5M]	2	4
OR			
5	Evaluate the simplified expression in product of sums for the following Boolean functions using K maps and draw the logic diagram. a) $F(A,B,C,D) = \Pi(0,1,2,3,4,10,12,11,15)$ [5M]	2	4

	b) $F(A,B,C,D,E) = \pi(1,3,13,19,25)$ [5M]		4
6	a) Construct a 5-to-32 line decoders with four 3-to-8 line decoders with enable and a 2-to-4 line decoder [5M] b) Construct a 4 bit magnitude comparator and explain in detail [5M]	3	5 5
	OR		
7	a) What is a combinational logic circuit? Design a full binary adder with two half adders and a OR gate. [5M] b) Implement a 64:1 MUX using 16:1 and 4:1 MUXs. [5M]	3	5 5
8	What is the drawback of JK flip flop, design a flip flop which overcomes this drawback and explain with neat diagram. [10M]	4	5
	OR		
9	a) Construct Negative Edge SR Flip Flop and draw its truth table. [5M] b) Design the conversion of SR flip flop into JK flip flop. [5M]	4	5 5
10	a) Design a 4-bit universal shift register using D flip flops and multiplexers? [5M] b) Design a 3-bit Ripple counter using JK flip flops. [5M]	5	5 5
	OR		
11	a) Draw the circuit diagram of a 4-bit binary counter with parallel in parallel out and explain its working with its function table. [5M] b) Design a 4-bit synchronous up-counter with D flip - flops and explain its working. [5M]	5	5 5