



R22 Regulation

Subject code: 4E4BB

**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY**

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

**B.Tech IV Semester Supplementary Examinations, December 2024**

**DIGITAL ELECTRONICS**

(EEE)

Maximum Marks: 60

Date:05.12.2024

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)	The numbers $(432.2)_8$ and $(1101.01)_2$ in base converts into base 10.	CO1	L2
b)	Write the EXCLUSIVE-OR operation?	CO1	L2
c)	Draw a logic diagram of EXOR gate using NOR gates.	CO2	L2
d)	Obtain the PI, EPI for given function $f(x, y, z) = \sum(0, 2, 3, 5)$	CO2	L2
e)	Compare between combination circuit and sequential circuits.	CO3	L2
f)	How many 4X1 MUX required to implementation of 32 X1 MUX?	CO3	L2
g)	Write the D flip flop Truth table?	CO4	L2
h)	How many used and unused states for 4 bit ring counter?	CO4	L2
i)	Compare Moore and Mealy machines.	CO5	L2
j)	Discuss the capabilities and limitations of FSM?	CO5	L2
Part-B			Bloom Tx level
Answer All the following questions. (5X10M=50Marks)			
2	Convert the following numbers in the way specified: [10M]		L3
	i. $(11001010.0101)_2$ to base 10		
	ii. $(53.1575)_{10}$ to base 2		
	iii. $(11001101.0101)_2$ to base 16		
	iv. The numbers $(432.2)_8$ to base 10		
OR			
3	Given the 4-bit data word 1101, generate 7-bit Hamming code word and detect and correct single bit error. [10M]		L3
			L3
4	Minimization the switching functions for product of sum term $f(w, x, y, z) = \pi(1, 3, 4, 5, 9, 10, 11) + \sum_{\phi}(6, 8)$ [10M]		L3
OR			
5	Determine the minimal sum-of-products expression for $f(w, x, y, z) = \sum(0, 2, 8, 10, 12, 14) + \sum_{\phi}(3, 5, 10)$ [10M]		L3
			L3

6	<p>a. Implementation of full subtractor using NAND Gates [5M]</p> <p>b. Design a Full Adder using two half adders [5M]</p>		L3																							
OR																										
7	Implement the function using Encoder for $F(w, x, y, z) = \sum(0, 1, 4, 5, 6, 7, 9, 11, 15)$ [10M]		L4																							
8	<p>a. How can you convert an SR flip-flop to a JK flip-flop? [5M]</p> <p>b. Write the excitation table of SR flip-flop [5M]</p>		L3																							
OR																										
9	<p>a. List the type of Register and explain the Parallel in serial out shift(PISO) register [5M]</p> <p>b. Compare between the synchronous and asynchronous counter [5M]</p>		L2																							
10	Reduce the following state table using partition technique. [10M]		L4																							
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">P.S</th> <th colspan="2">N.S. , O/P</th> </tr> <tr> <th>X = 0</th> <th>X = 1</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>B,0</td> <td>E,0</td> </tr> <tr> <td>B</td> <td>E,0</td> <td>D,0</td> </tr> <tr> <td>C</td> <td>D,1</td> <td>A,0</td> </tr> <tr> <td>D</td> <td>B,1</td> <td>E,0</td> </tr> <tr> <td>E</td> <td>C,0</td> <td>D,0</td> </tr> </tbody> </table>	P.S	N.S. , O/P		X = 0	X = 1	A	B,0	E,0	B	E,0	D,0	C	D,1	A,0	D	B,1	E,0	E	C,0	D,0					
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11	<p>a. What are the rules to develop a meger chart. [5M]</p> <p>b. Construct the compatibility graph and obtain the minimal cover table for given machine [5M]</p>		L3																							
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