



R20 Regulation
TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A' Grade)

Subject code: 3P3EC

B.Tech III Semester Regular Examinations, February 2022
LOGIC CIRCUITS DESIGN

(Common to CSE and CSE(AI&ML))

Maximum Marks: 70

Date: 23.02.2022 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 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

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 Convert the hexadecimal number 2FC3 into binary and decimal.
- 2 Write down the Octal equivalent of hexadecimal number 3A2E.
- 3 Find the sum of numbers 74998 and 38976 by BCD addition.
- 4 Differentiate between Decoder and Encoder
- 5 What is Ripple Counter?
- 6 How Flip-Flop Excitation tables are designed ?
- 7 How do we perform Shift Micro-operations ?
- 8 What is Arithmetic Logic Shift Unit?
- 9 List out Sequential Programmable Devices and their usage.
- 10 Define Memory decoding and its applications.

Part-B

Answer All the following questions.

(5X10M=50Marks)

- 11 a) Differentiate Canonical and Standard forms
b) Design a 3-bit gray to binary decoder. 3M
7M
- OR

12 Two numbers A & B in Hex are given A= 85CA, B= 23C6
i. Find the Decimal equivalent of A & B 3M
ii. Find the binary of A & B 3M
iii. What is the sum of A& B in HEX 4M
- 13 Using K map simplify the SOP function, and realize it using only NAND gates. 10M
$$f(a,b,c) = \sum m(0,2,3,4,5,6)$$

OR

14 a) Express $f = AB + AC + C + AD + ABC + ABC$ in standard SOP form. 5M
b) Using K map simplify the SOP function, and realize it using logic gates. 5M
$$f(a,b,c,d) = \sum m(0,1,2,4,5,6), d = \sum (3,7,14,15)$$

- 15 a) Convert a D flipflop into a JK flipflop, showing all the steps. 5M
 b) Design a synchronous counter using T flipflop to count the following sequence. 5M
 0-3-1-4-6-0
- OR
- 16 Explain the working of a 4-bit twisted ring counter, with the help of timing diagrams. 10M
- 17 A register is to be designed, which provides all the following functions shift left, shift right, parallel in, parallel out, serial in, serial out, serial in parallel out and parallel in serial out. Draw the circuit for a 4-bit data (serial/parallel) and provide its working. 10M
- OR
- 18 A logic circuit has our inputs A,B,C and D. A four bit input is fed with A as MSB and D as LSB. Design and implement a circuit such that the output is one when the input is more than or equal to decimal 6. 10M
- 19 Implement the following two Boolean functions with a PLA: 10M
 $F1(A,B,C) = \sum m(0,1,2,4)$
 $F2(A,B,C) = \sum m(0,5,6,7)$
- OR
- 20 a) Differentiate between Programmable Logic Array and Programmable Array Logic 5M
 b) Draw and explain the state transition diagram of mod-6 counter in a asynchronous sequential logic. 5M