R17 Regulation *Subject code:* 1P3ED

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech II Year I Semester Supplementary Examinations, February 2021

DIGITAL LOGIC DESIGN

(Computer Science and Engineering)

Maximum Marks: 70 Date: 26.02.2021 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 Show that (X + Y' + XY)(X + Y')(X'Y) = 0
2 Binary to Decimal conversion : $(111001.1011)_2$
3 List the methods adopted to reduce Boolean function?
4 What are called don't care conditions?
5 Differentiate combinational and sequential circuits.
6 Define Encoder?
7 What are the types of shift register?
8 Explain about the two models in synchronous sequential circuits.
9 What are the different types of RAM?
10 Define race condition.

Part-B

Answer All the following questions. **(10M X 5=50Marks)**

11 Write the names of Universal gates. Why they are called so? Prove that for constructing XOR from NANDs we need four NAND gates.

OR

12 Simplify the following Boolean expression to a minimum number literals:
a)XY+XY'
b)(X+Y)(X+Y')
c)XYZ+X'Y+XYZ'
d) (A+B)'(A'+B')'

13 Find a minimum sum of products expression for the following function using K-map method.
F (A,B,C,D,E) = ∑(0,2,3,5,7,9,11,13,14,16,18,24,26,28,30)

OR

14 Given the Boolean function
F= xy'z + x'y'z + w'xy + wx'y + wxy
a) Obtain the truth table of the function.
b) Draw the logic diagram using the original Boolean expression.
c) Simplify the function to a minimim number of literals using Boolean algebra.

d) Obtain the truth table of the function from the simplified expression and show that it is the same as the one in part (a)
e) Draw the logic diagram from the simplified expression and compare the total number of gates with the diagram of part (b)

15 Design a half adder. What is the limitation of half adder? How do you convert it into a Full-Adder ?

OR

16 Narrate the combinational circuit design procedure with Examples.

17 Define SR–Flip-flop with the help of a logic diagram and characteristic table? Convert a T-FF into an S-R FF. Draw the circuit.

OR

18 Define the following with examples: i) asynchronous sequential circuits, ii) Cycles, iii) critical race, non- critical race and race iv) flow table and primitive flow table v) stable state

19 A. Write the difference between RAM and ROM.
B. Explain different types of RAM.

OR

20 Write short notes on
a. Arithmetic micro operations
b. Logic micro operations