R20 Regulation *Subject code: 3P3EC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Semester Supplementary Examinations, June 2026

LOGIC CIRCUITS DESIGN

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

Maximum Marks: 70 Date: 16.06.2026 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)	Marks	CO	BTL
1	State De Morgan's theorem.	2M	1	L1
2	Reduce A (A + B).	2M	1	L1
3	Define half adder and full adder.	2M	2	L1
4	Define combinational logic.	2M	2	L1
5	Define Flip flop.	2M	3	L1
6	Define counter.	2M	3	L1
7	Define Register transfer language.	2M	4	L1
8	What is bus and memory transfer?	2M	4	L1
9	Define RAM and types.	2M	5	L1
10	Define address and word.	2M	5	L1

Part-B

	Answer All the following questions. (5X10M=50Marks)	Marks	CO	BTL
11	a) Represent the decimal number 8620 in i) BCD ii) Excess-3 code iii) Gray Code b) Determine the value of base x if (211) x= $(152)_8$	5M 5M	1	L2
	OR			
12	a) Simplify the Boolean expressions to minimum number of literals. i) X' + XY + X Z' + XYZ' ii) (X+Y) (X+Y') b) Obtain the Complement of Boolean Expression. i) A+B+A'B'C ii) AB + A (B +C) + B'(B+D)	5M 5M	1	L2
13	Simplify the Boolean expression using K-map F (A,B,C,D,)= Σm(0,2,3,7,11,13,14,15)	10M	2	L2
	OR			
14	Explain 8:1 Multiplexer and 4:1 Demultiplexer.	10M	2	L2
15	Write the differences between (a)Combinational circuits and sequential circuit. (b)Flip- flops and Latches	5M 5M	3	L2

	OR			
16	Write the different kinds of flip-flops. Explain the SR flip-flop.	10M	3	L2
17	a) With a neat diagram explain in detail about ALU (Arithmetic Logic Shift Unit). b) Design and explain a 4-bit binary parallel Adder.	6M 4M	4	L2
	OR			
18	What is athematic logic shift unit with neat diagram?	10M	4	L2
19	Implement the following Boolean function to a minterm number of term results with a PAL. $F1(A,B,C,D)= \Sigma(2,12,13)$ $F2(A,B,C,D)= \Sigma(7,8,9,10,11,12,13,14,15)$ $F3(A,B,C,D)= \Sigma(0,2,3,4,5,6,7,8,10,11,15)$ $F4(A,B,C,D)= \Sigma(1,2,8,12,13)$	10M	5	L2
	OR			
20	Implement the following two Boolean function with a PLA. $F1(A,B,C)= \Sigma(0,1,2,4)$ $F2(A,B,C)= \Sigma(0,5,6,7)$	10M	5	L2