

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***UG/PG DEGREE END SEMESTER THEORY EXAMINATIONS, APR/MAY 2026****Third Semester****Electronics and Communication Engineering****UECTL24301- DIGITAL SYSTEMS DESIGN****Regulations – 2024****Duration : 3 Hrs****Maximum : 100 Marks****PART – A(ANSWER ALL QUESTIONS) (Marks 10*2=20)**

Q.No	Questions	BTL	CO	Marks
1.	State De-Morgan's theorem?	L1	1	2
2.	Outline the concept of duality in Boolean algebra?	L2	1	2
3.	Implement Boolean function $F = \sum m(1,2,3,7)$ using 3:8 decoder?	L3	2	2
4.	Draw the logic diagram for half subtractor?	L1	2	2
5.	How many flip flops are required for designing synchronous MOD 60 counter?	L2	3	2
6.	Interpret the D-Latch FF with truth table?	L2	3	2
7.	Define stable and unstable state?	L1	4	2
8.	What are output specifications in asynchronous circuits?	L2	4	2
9.	Give any two applications of PLA?	L1	5	2
10.	Compare SRAM and DRAM?	L2	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

Q.No	Questions	BLT	CO	Marks
11.	a i Realize the logic functions using NAND and NOR gates?	L2	1	10
	ii Simplify the expression $Y = \sum m(7,9,10,11,12,13,14,15)$ using the K map method?	L2	1	6
Or				
b	Find the minimal sum of product for the Boolean expression $f = \sum(1,2,3,7,8,9,10,11,14,15)$ using the Quine-Mc-Cluskey Method?	L2	1	16
12.	a Implement full adder with inputs x,y,z and two outputs S and C using multiplexer?	L3	2	16
Or				
b	What is magnitude comparator. Design 2 bit Magnitude comparator and drive expression for $A > B$, $A < B$ and $A = B$. Realize using Gates?	L3	2	16
13.	a i Design and explain the working of 4-bit parallel counter using T-flip flop. Draw its excitation table and state table?	L3	3	8
	ii Write short notes on universal shift registers?	L2	3	8
Or				
b	i Design a MOD 5 synchronous counter using JK flip flop and illustrate its timing diagram?	L3	3	8
	ii Explain the working of ring shift counter with necessary neat diagram?	L2	3	8
14.	a Analyze about different hazards that occur in sequential circuits and methods to eliminate the hazards?	L4	4	16

Or

	b	Examine and explain about Races and infer the different methods of state assignment?	L4	4	16	
15.	a	i	Design the following function using PAL $F_1(A,B,C) = \Sigma(1,2,4,6)$ and $F_2(A,B,C)=\Sigma(0,1,6,7)$?	L4	5	10
		ii	Describe the typical ROM internal organization with necessary diagram?	L2	5	6
Or						
	b	i	Analyze the following Boolean functions using 8*2 PROM $F_1=\Sigma m(3,5,6,7)$ and $F_2=\Sigma m(1,2,3,4)$?	L4	5	10
		ii	Elaborate the internal organization of typical ROM with necessary diagram?	L2	5	6
