Basavarajeswari Group of Institutions

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

USN											Course Code	2	1	C	S	3	4

Third Semester B.E. Degree Examinations, March/April 2023
DIGITAL SYSTEMS DESIGN AND COMPUTER ORGANIZATION
(Common to CSE & AIML)

Duration: 3 hrs **Max. Marks: 100**

Note: *1. Answer any* **FIVE** *full questions, choosing* **ONE** *full question from each module.*
2. Missing data, if any, may be suitably assumed

Q. No		*Question*	*Marks*	*(RBTL:CO: PI)*
		MODULE – 1		
1.	**a.**	(i) Solve the following functions using K-Map to find minimum sum-of-products. **f(A, B,C,D)= ∑m(3, 4, 11, 15) + d(5, 6, 7, 8, 9, 10) and** **f(r, s, t)= rs`+r`s`+st`** (ii) Solve the following functions using K-Map to find POS **f=ab`d`+a`b+a`c+cd**	**10**	(3 :1: 1.7.1)
	b.	Solve for the function F **(A, B, C, D) = ∑m (1, 7, 8, 13, 16, 19) + d (0, 3, 5, 6, 9, 10, 12, 15).** (i) Karnaugh map for F. (ii) Prime implicants of F. (Prime implicants containing only don't-cares need not be included.) (iii) Minimum sum of products for F. (iv) Minimum product of sums for F.	**10**	(3 :1: 1.7.1)
		OR		
2.	**a.**	(i)List all prime implicants and all minimum sum-of-products expressions using k-map: - **f (A, B, C, D) =Σm (3, 4, 11, 15) +Σd (5, 6, 7, 8, 9, 10)** (ii)Solve the below function using MEV technic and draw reduced circuit using Basic gates: - f**(A, B,C,D)=Σm(1, 2, 4, 13, 14)+Σd(5, 6, 7, 8, 9, 10)**	**10**	(3 :1: 1.7.1)
	b.	(i)Solve using QM method **F (a, b, c) = Σ m (0,1,2,5,6,7)** find minimum SOP. (ii)Solve using QM method **F (a, b, c) = A`B`C` + A`B`C +A`BC+AB`C** find minimum SOP	**10**	(3 :1: 1.7.1)
		MODULE – 2		
3.	**a.**	(i)What is multiplexer? Explain **8:1 MUX** using along with Truth table and Circuit diagram. (ii)Construct **16:1 MUX** and **8:1 MUX** for **F (a, b, c, d) = Σ m (0,1,2,5,6,7,11)**	**10**	(2:2: 1.7.1)
	b.	(i)What is Decoder? Explain 3:8 Decoder using along with Truth table and Circuit diagram. (ii)Explain Decimal to BCD encoder	**10**	(2 :2: 1.7.1)
		OR		
4.	**a.**	Explain PLA and PAL. Implement a Full Subtractor using a PAL.	**10**	(2 :2: 1.7.1)

Note: (**RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI - Performance Indicator)**

	b.	Explain J K Flip Flop along with characteristics equation.	**10**	(2 :2: 1.7.1)

MODULE – 3

5.	**a.**	Explain 8-bit serial-in, serial-out shift register.	**10**	(2 :3: 1.7.1)
	b.	Construct MOD-5 counter using D and J K Flip Flops	**10**	(3 :3: 1.7.1)
		OR		
6.	**a.**	Construct Decade counter using JK Flip Flop	**10**	(3 :3: 1.7.1)
	b.	Explain: (i) Sequential parity checker and (ii) Register transfers	**10**	(2 :3: 1.7.1)

MODULE – 4

7.	**a.**	Explain steps of Basic operational concepts of computer for add LOCA, R0, With neat diagram.	**8**	(2 :4: 1.7.1)
	b.	Explain factors effecting performance of the computer? Give basic Performance equation and overall SPEC rating of computer.	**8**	(2 :4: 1.7.1)
	c.	Explain Big-Endian & Little-Endian. Show the content of the two memory words at address 1000 and 1004 after the name "Johnson" has been entered in both methods.	**4**	(2 :4: 1.7.1)
		OR		
8.	**a.**	Explain any 4 addressing modes with examples.	**8**	(2 :4: 1.7.1)
	b.	Solve and explain Y= (A+B) *(C+D) using one-address, two-address, three-address	**7**	(3 :4: 1.7.1)
	c.	What is Branching? Explain with example	**5**	(2 :4: 1.7.1)

MODULE – 5

9.	**a.**	Explain handling multiple devices: i) Vectored interrupt and interrupt nesting. ii) simultaneous request (daisy chain, arrangement of priority groups)	**8**	(2 :5: 1.7.1)
	b.	Explain I/O interface for an input device	**5**	(2 :5: 1.7.1)
	c.	What is DMA? What are it advantages? With supporting diagram, explain different registers used in DMA interface.		(2 :5: 1.7.1)
		OR		
10.	**a.**	Solve addition and subtraction of following numbers: i) -5 and 7 ii) -3 and -8 iii) 5 and 10	**6**	(3 :5: 1.7.1)
	b.	Explain logic diagram: i) 4-bit carry lookahead adder ii) addition-subtraction logic network	**7**	(2 :5: 1.7.1)
	c.	Apply booth algorithm to perform the multiplication on +13 and -06.	**7**	(3 :5: 1.7.1)

** ** **

Note: (**RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI - Performance Indicator)**