Program:	F.Y.B.Sc CS	**Semester:**	I	**Program Code:**	UGCS02
Course:	Digital System & Architecture			**Course Code:**	NUCS101
Duration:	1 Hour	**Examination Pattern:**	NEP - Autonomous – External	**Max. Marks:**	30

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Draw neat diagrams wherever necessary.
4. CO (Course Outcome), KL (Knowledge Level).

Examination:

REGULAR

Q. 1		**Attempt any TWO of the following.**	[10]	CO's	KL's
	(a)	Compare XOR and XNOR gates with suitable Diagram ,Expression and Truth table.		CO1	L3
	(b)	Explain the working of JK and D flip-flops with truth tables. Mention one application of each.		CO2	L2
	(c)	Prove that NAND gate is a universal gate by implementing NOT, AND and OR gates using NAND gates.		CO1	L3
	(d)	Simplify the Boolean function F(A,B,C,D) = Σm(0,2,3,6,7,8,10,11,14,15) using a 4-variable K-map and obtain the minimum SOP expression.		CO1	L3
Q. 2		**Attempt any TWO of the following.**	[10]	CO's	KL's
	(a)	Explain any three Data Transfer group instructions with Suitable Examples.		CO3	L2
	(b)	What is a flag register? Explain Carry, Zero, Sign, Auxiliary Carry and Parity flags.		CO3	L2
	(c)	Explain the instruction cycle with the help of a neat flow diagram. Describe the Fetch, Decode and Execute phases.		CO3	L3
	(d)	For the page reference string (1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5, 2, 4, 5 2 ,1 ,3, 4, 6 , 7, 4, 2 ,1 ,3, 2) with 3 page frames, calculate the number of page faults using the FIFO & LFU in Algorithm for page replacement .		CO4	L3
Q. 3		**Attempt any TWO of the following.**	[10]	CO's	KL's
	(a)	Design a Full Adder using two Half Adders and an OR gate. Derive the Sum and Carry expressions and draw the logic circuit.		CO1	L3
	(b)	State and verify De Morgan's Laws using truth tables and Boolean expressions.		CO1	L2
	(c)	Explain any four addressing modes with suitable examples.		CO3	L2
	(d)	What is an instruction format? Explain the purpose of the opcode and operand fields. Illustrate a suitable instruction format and its types with an example.		CO3	L2

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