GUJARAT TECHNOLOGICAL UNIVERSITY
MCA – SEMESTER - I • EXAMINATION – WINTER 2012

Subject code: 610004   **Date: 07/01/2013**
Subject Name: Fundamentals of Computer Organization (FCO)
Time: 02:30 pm – 05:00 pm   **Total Marks: 70**
Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q. 1	**(a)**	1. Prepare a truth table for the boolean expression: ABC+ AB'C' + A'B'C'	**01**
		2. Prove the two basic De Morgan theorems, using the proof by perfect induction.	**02**
		3. Draw K-map for:	**04**
		a. m0 + m1 + m4 + m5 (K-map in A,B,C)	
		b. m2 + m6+ m8+ m10 + m14 (K-map in W,X,Y,Z)	
	(b)	Perform the following operations:	**01**
		1. 0011 – 1000 (Using 2's complement system).	**01**
		2. Convert the hexadecimal number E2C.8 to Binary.	**02**
		3. Prove by perfect induction X+X'Y =X+Y	**03**
		4. Derive a Boolean expression (in SOP form) for a logic circuit that will have a 1 output when X=0, Y=0, Z=1 and X=1, Y=1, Z=0 and a 0 output for all other input states. Draw a block diagram for this logic circuit.	
Q. 2	**(a)**	Write short note on universal gates with circuit and truth table.	**07**
	(b)	Write a note on display units. **OR**	**07**
	(b)	Write a short note on Printer and its types.	**07**
Q. 3	**(a)**	Discuss the concept of Master Slave Flip-Flop with Diagram.	**07**
	(b)	Explain RS Flip Flop by giving its characteristic table and the circuit diagram.	**03**
	(c)	Explain Cache Memory and Virtual Memory.	**04**
		OR	
	(a)	Explain Up-Down counters with example.	**07**
	(b)	Explain 4-bit shift register with example.	**07**
Q. 4	**(a)**	Explain BCD adder with example.	**07**
	(b)	Briefly explain the working of Half-Adder and Full-Adder along with the circuit diagrams.	**07**
		OR	
	(a)	Explain how to multiply 7*9 in the registers. (all are 5 bit registers)	**07**
	(b)	Reduce following expression using K-map and write SOP and POS form of Reduced expression. Draw circuit using Universal Gate. f=Σm(0, 2, 8, 9, 10, 11) + d(1, 3)	**07**
Q.5.	**(a)**	1. Write short note on instruction formats.	**04**
		2. Write short note on modes of Transfer.	**03**
	(b)	1. Explain various components of ALU in brief.	**03**
		2. Explain 3-to-8 decoder.	**04**
		OR	
	(a)	What is a Multiplexer? Explain 4-to-1 line multiplexer.	**07**
	(b)	What is Decoder ? Explain Binary to Octal Converter.	**04**
	(c)	Explain JK flip-flops.	**03**

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