

ME10L
01

USN

--	--	--	--	--	--	--	--	--	--

10MCA13

First Semester MCA Degree Examination, June/July 2015
Fundamentals of Computer Organization

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1 a. Perform the following conversions:
- $(753)_8 = (?)_{10}$
 - $(567.1875)_{10} = (?)_{16}$
 - $(ABBA)_{16} = ()_8$
 - $(1010.011)_2 = ()_{10}$ (08 Marks)
- b. Justify NAND gate as a universal gate. Also construct AND, OR, NOT and NOR gate using NAND gate. (06 Marks)
- c. Write the logical symbol, Boolean expression and Truth table for the following:
- Three – input XOR gate
 - Three – input XNOR gate. (06 Marks)
- 2 a. Convert the given maxterm Boolean expression to its mixterm showing all four steps.
 $(A + \bar{B} + \bar{C}). (\bar{A} + B + \bar{C}) = Y$. (06 Marks)
- b. State and prove De-Morgans theorem. (06 Marks)
- c. Simplify the following Boolean expressions using Karnaugh maps:
- $\bar{A}.B.C + \bar{A}.B.\bar{C} + A.\bar{B}.\bar{C} + A.B.C = Y$
 - $\bar{A}.B.C.\bar{D} + \bar{A}.\bar{B}.\bar{C}.D + \bar{A}.\bar{B}.C.D + \bar{A}.B.C.\bar{D} + A.\bar{B}.\bar{C}.D + A.B.C.D = \bar{Y}$ (08 Marks)
- 3 a. What are bits, bytes and Nibbles? (06 Marks)
- b. Perform the following subtraction (X-Y) using 2's complement arithmetic:
 $X = (+65), Y = (+35)$. (04 Marks)
- c. What is full adder? With the truth table of full adder obtain logical expression for the SUM and CARRY terms and implement the same using i) Two half adder ii) XOR and NAND gates. (10 Marks)
- 4 a. Explain basic functional units of a computer with a neat diagram. (07 Marks)
- b. What is a bus? Briefly explain single-bus structure with a neat diagram. (04 Marks)
- c. What is meant by addressing mode? Explain any four addressing modes with suitable example. (09 Marks)
- 5 a. Briefly explain interrupt hardware with a neat diagram. (04 Marks)
- b. Explain DMA controller in detail. (10 Marks)
- c. What is bus arbitration? With a neat diagram explain distributed arbitration. (06 Marks)
- 6 a. Describe the internal organization of a $2M \times 8$ dynamic memory chip. (07 Marks)
- b. Describe a Rom cell. Explain any three types of ROM stating their advantages and disadvantages. (08 Marks)
- c. What are virtual memories? Briefly explain virtual memory organization with a neat diagram. (05 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- 7 a. Explain Booth algorithm for signed-operand multiplication. Give the multiplication of (+13) and (-6) operands. (07 Marks)
- b. Explain restoring integer division with a circuit arrangement. Illustrate $8 \div 3$ using this technique. (08 Marks)
- c. Explain the standard IEEE standard floating point formats. Also explain floating point normalization in IEEE single-precision format. (05 Marks)
- 8 Write short notes on:
- a. RISC and CISC
- b. Big-Endian and Little Endian byte addressability
- c. Half subtractors
- d. Three-bit parallel adder. (20 Marks)

* * * * *