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13MCA13

First Semester MCA Degree Examination, Dec.2015/Jan.2016
Fundamentals of Computer Organization

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1 a. Perform the following number base conversions.
 - i) $(365)_8 = ?_{16}$ ii) $(3FD)_{16} = ?_2$ iii) $(526.72)_{10} = ?_8$ (10 Marks)
 - iv) $(306.D)_{16} = ?_{10}$ v) $(11011011.100101)_2 = ?_{16}$
- b. Perform the following subtractions by using
 - i) r's complement $(1010100)_2 - (1000100)_2$ (10 Marks)
 - ii) $(r - 1)$'s complement $(3250)_{10} - (72532)_{10}$
- 2 a. Find the complement of the given function by using De Morgan's Theorem. (03 Marks)
 $F = x'y + xy'$
- b. Find minimal SOP – SUM of products and POS product of SUMs by using K – Map. (07 Marks)
 $F(A, B, C, D) = \sum_m(0, 2, 4, 5, 6, 7, 8, 10)$
- c. What is Adder? Design a full adder circuit diagram by using 2 half adders. Derive the expressions for sum and carry from the truth table. (10 Marks)
- 3 a. Explain Booth Algorithm for signed numbers. Find the solution for $(+13) * (-6)$. (10 Marks)
- b. Implement the following function by using 8×1 multiplexer. (05 Marks)
 $F(A, B, C, D) = \sum(0, 1, 3, 4, 8, 9, 15)$
- c. Explain the sequence of steps to implement the given function by using only NOR gates. (05 Marks)
 $F = (A+B)(C+D)E$
- 4 a. What is flip-flop? Explain the working principle of T – flip flop with logic diagram and truth table. (10 Marks)
- b. What is Ripple counter? Explain BCD Ripple counter with neat diagram. (10 Marks)
- 5 a. Explain connection between memory and processor. Discuss about the flow of execution of instructions. (08 Marks)
- b. What is performance? Discuss about any five factors affecting the performance of a computer. (07 Marks)
- c. Define bus. Explain single bus architecture. (05 Marks)
- 6 a. What is addressing? Explain any 5 types of addressing modes with example for each. (12 Marks)
- b. Write a note on condition code flags. (04 Marks)
- c. Write an assembly language code for the given expression by using one, two and three address instructions in a single program. (04 Marks)
 $expr = (A * B) + (C * D)$
- 7 a. What is interrupt? Explain about simultaneous request handling by the processor. (10 Marks)
- b. What is Bus Arbitration? Explain about the two approaches of Bus Arbitration. (10 Marks)
- 8 a. Explain direct mapping and associative mapping functions of cached memory organization. (10 Marks)
- b. Write a note on the following :
 - i) Virtual memory (10 Marks)
 - ii) Read only memories.

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.