



Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science & Engineering

Midterm Examination, Summer 2025

Course Code: CSE413 Course Title: Computer Architecture and Organization

Level:3 Term:1 Batch:64

Time: 01:30 Hrs

Marks: 25

Answer ALL the Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes]

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| 1. | a) | Over the decades, computers have evolved from huge machines to portable devices. Illustrate the key technology used in each generation of computers (first to fifth generation). How did these changes impact the size and cost of computers? | [5] | CO1 |
| 2. | a) | Suppose your system has a main memory with a page size of 8 bits (i.e., each memory location can store 8 bits or 1 byte). You need to store a 28-bit hexadecimal number starting at memory address A1EF0. a) First, assume any 28-bit hexadecimal number, convert it into binary representation. b) Then, demonstrate how this 28-bit binary number would be stored in memory in Little-Endian formats. | [4] | CO3 |
| | b) | Apply the following instruction operand techniques to evaluate the operation: $z = (a + b) \times (c - d) / e$ a) Zero-operand (stack-based) instruction sequencing. b) Two-operand instruction sequencing. Assume all variables are in memory and follow standard operator precedence system to solve the operation. | [5] | CO2 |
| 3. | a) | Assume, you are designing a voting system that accepts votes from three judges (A, B, C). The system should output a 1 (True) if at least two judges vote Yes (1), and 0 (False) otherwise. Now, sketch a logic circuit using universal gates only to implement this above scenario along with the truth table from above scenario. And briefly explain why using universal gates are advantageous in this scenario. | [6] | CO2 |
| | b) | Suppose, you are given two 8-bit unsigned binary numbers whose corresponding decimal values are 247 and 108. Now, using the 2's complement method, perform the subtraction $247 - 108$. Show the complete step-by-step in binary using 2's complement including all necessary binary conversions, intermediate steps and the final binary and decimal result. | [5] | CO2 |