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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]

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]	
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]	