



**Daffodil International University**  
**Faculty of Science & Information Technology**  
**Department of Computer Science & Engineering**  
**Midterm Examination, Summer 2026**

**Course Code: CSE 317, Course Title: Microprocessor and Microcontroller**

**Level:3 Term:1 Batch: 66**

**Time: 01:30 Hrs**

**Marks: 25**

**Answer ALL Questions**

*[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]*

|   |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |     |
|---|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----|
| 1 | b) | Trace the evolution of Intel microprocessors from the 8086 to the Pentium/Compare their architectural features/and discuss how each generation improved processing performance/cache) memory management/and multitasking capabilities/                                                                                                                                                                                                                                                                                                                                               | [5]   | CO1 |
| 2 | a) | Consider the following 8086 instruction:<br>MOV AX, [2500H]<br><br>Explain how the internal architecture of the 8086 microprocessor executes this instruction. Your explanation should include:<br><br><ul style="list-style-type: none"> <li>1. The role of the Bus Interface Unit (BIU) and Execution Unit (EU).</li> <li>2. How the physical address is generated.</li> <li>3. How the instruction is fetched from memory.</li> <li>4. How the operand is accessed and transferred to the AX register.</li> <li>5. The role of the instruction queue during execution.</li> </ul> | [5]   | CO2 |
|   | b) | In an 8086-based system, the MN/MX pin is set to logic 1. A DMA controller needs to transfer a large amount of data directly between memory and an I/O device. Explain how the 8086 temporarily gives up control of the system bus and later regains it after the transfer is complete.<br>Also, explain how memory addressing and bus-cycle behavior differ when the transfer begins at an odd address involving both even and odd memory banks.                                                                                                                                    | [5]   |     |
| 3 | a) | Consider the following register contents of an 8086 microprocessor:<br><ul style="list-style-type: none"> <li>• DS = 2500H</li> <li>• ES = 3600H</li> <li>• BX = 1200H</li> <li>• SI = 0300H</li> <li>• DI = 0100H</li> <li>• BP = 0800H</li> </ul><br>Identify the Addressing Mode and Calculate the Physical Address (PA) for each instruction.<br><br>(a) MOV AX, [BX+SI]<br>(b) MOV AX, [BX+DI+50H]<br>(c) MOV AX, [BP+SI+20H]<br>(d) MOV AX, [1200H]                                                                                                                            | [4]   | CO3 |
|   | b) | Write the assembly programs for the following scenario                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | [3+3] |     |

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|  | <p>i. A 8086-based system is used in an automated billing machine. The system performs arithmetic operations and uses conditional jumps to decide the final output. The machine follows these rules:</p> <p>It first adds two 16-bit numbers stored in memory locations 3000H and 3002H.</p> <ul style="list-style-type: none"> <li>❖ If the result is greater than 2000H, it applies a premium charge.</li> <li>❖ If the result is equal to 2000H, it applies a standard charge.</li> <li>❖ If the result is less than 2000H, it applies a discount.</li> </ul> <p>ii. A banking system subtracts the withdrawal amount from the account balance.</p> <p>If the result becomes zero, the account is marked as empty.<br/>         If the result becomes negative, the transaction is rejected.<br/>         If the result is positive, the transaction is successful.</p> |  |  |
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