Daffodil International University
Faculty of Science & Information Technology
Department of Software Engineering
Final Examination, Spring 2026
Course Code: SE 222; Course Title: Computer Architecture
Batch & Sections: 44 (A to K)
Course Teachers: AS, HKN, HT, AJE

Time: 2:00 Hrs **Marks: 40**

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. a) **Compare** the effectiveness of direct mapping and associate mapping in terms of hit ratio and searching time. **[Marks-4]**

b) Consider a direct mapped cache that has a physical address of 32 bits. Memory block size is 128 bytes and cache memory is 512 KB. **Examine** the main memory size, number of cache lines in cache memory and cache directory size. **[Marks-6]**

CLO-2 *Level-4*

2. a) **Illustrate** the steps of Booth's algorithm for 2's complement multiplication for the following values: **[Marks-6]**

Multiplicand: $(B)_{16}$
Multiplier: $(-2)_{16}$

b) **Explain** branch instructions, skip instructions and procedure instructions with example. **[Marks-6]**

c) **Describe** the purpose of Overflow bit, Supervisor bit and Interrupt bits in flag register. **[Marks-3]**

d) **Transform** the following IEEE754 single precision floating point binary number into decimal **[Marks-5]**

1	01111001	11110111010000000000000 12345678910

CLO-3 *Level-4*

3. a) **[Marks-5]**

Instruction Sets			
INT_Add	R1	R2	R3
INT_Subtract	R4	R1	R6
INT_Division	R6	R3	R5
INT_Multiply	R7	R4	R5

Visualize a Five-stage pipelining process for the given instructions where division needs two clock cycles for instruction execution and **discuss** types of Potential Hazard occurring here?

b) **Show** the Effective Address (EA) calculation process of Stack and Displacement addressing technique with figure. Investigate the two address machine instruction for the given equation: **[Marks-2+3]**

$$Y=A*D - B/C$$

CLO-4 *Level-31*

32
7, 12, 13
4GB 17×2 6656bytes 000001 +1 10
IF ID OF E W
0.9658203125
− 0.030715994238