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Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science & Engineering
Midterm Examination, Spring 2026
Course Code: CSE 213 , Course Title: Algorithms
Level: 2 Term:1 Batch: 68

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.	a)	Explain what an algorithm is. Discuss the characteristics of a good algorithm using the RAM model as a reference.	02	CO1
	b)	Define asymptotic notations: Big-O, Big-Ω, and Big-Θ. Explain their significance in complexity analysis.	03	
2.	a)	Analyze the time and space complexity of Binary Search. Explain why it performs better than Linear Search.	02	CO2
	b)	Analyze the time complexity of the following code snippet and express it using asymptotic notation:	1.5*2 = 03	

```
#include <stdio.h>
int main () {
   int n; scanf ("%d", &n) ;
   int i = 1;
   while (i < n) {
      int j = 1;
      while (j < i) {
         j = j * 2;
      }
      i = i * 2;
   } return 0; }
```

```
#include <stdio.h>
int main () {
   int n; scanf ("%d", &n) ;
   for (int i = 1; i < n; i++) {
      for (int j = 1; j < i; j+=2)
         printf("Got it\n") ;
      }
   } return 0; }
```

3.	a)	Design a recursive algorithm for computing GCD using Euclid's algorithm and write pseudocode, also analyze its complexity.	05	CO3
	b)	Given coin denominations {1, 5, 10, 25}, design a Greedy algorithm to make change for an amount 117 . Explain why the greedy strategy works.	05	
	c)	Construct a Huffman Tree for the following frequencies: A:5, B:9, C:12, D:13, E:16, F:45 Show all steps to send the message "BADCAFE" using the Huffman Tree and compute total cost.	05	