United International University

Department of Computer Science and Engineering

CSE 2217/CSI 227 (A): Algorithms/Data Structure and Algorithms II

Trimester: Summer 2022

Class Test 1, Total Marks: **20**, Total Time: **30 minutes**

Question 1: Find out the Best Case, Worst Case, and Average Case of the following algorithm and represent using Asymptotic Notation. **[8 marks]**

```
1 int weirdSum(int n, int m) {
2     int sum = 0;
3     for(int i=n; i>=1; i--) {
4         for(int j=1; j<=m; j*=2) {
5             sum += (i+j);
6         }
7     }
8     return sum;
9 }
```

Question 2: Find out the Best Case, Worst Case, and Average Case of the following algorithm and represent using Asymptotic Notation. **[6 marks]**

```
1 bool search(int arr[], int n, int key) {
2     for(int i=0; i<n; i++) {
3         if(arr[i] == key) {
4             return true;
5         }
6     }
7     return false;
8 }
```

Question 3: Find the upper bound of the following time function mathematically. **[4 marks]**

$f(n) = 5n^3 + 9n^2 + 16\ log_2 n$ where n ≥ 1

Question 4: Write whether the following statements are **True** or **False**. If **false**, write the correct answer. **[2 marks]**

- **Statement 1:** If the tight bound of a time function is $O(n^3)$, we can say that $O(n^2\sqrt{n})$ is the upper bound of that function.
- **Statement 2:** $\Omega(n)$ is better than $\Omega(\sqrt{n})$.