CS1131 (Design and Analysis of Algorithms)
Quiz-1

Time - 45 Minutes

Name_____ Roll No._____

Q1. Which of the following is correct. **Marks 1.0**

1. $n = o(n^2)$
2. $n = O(n^2)$
3. Both 1 and 2 are correct
4. None are correct

Q2. A machine needs a minimum of 50 sec to sort 500 names by **merge sort**. The minimum time needed to sort 100 names will be approximately _____ **Marks 1.0**

Q3. Derive the relationship between $f(n) = 2n^5+3n^3+5n^2$ and $g(n) = 10n^3+6n$. **Marks 1.0**

Q4. Huffman tree is constructed for the following data :{A,B,C,D,E} with frequency {0.22, 0.34, 0.17, 0.19 and 0.08} respectively. **Marks 1.5 +0.5**
Draw the tree:

0010001100 is decoded as _____

Q5. Given connected components, apply **Quick Find** and fill the table:

0	1	2	3	4	5	6	7	8	9
0	1	1	3	8	5	1	1	8	8

(a) Connect (7,8). Write the modified array

0	1	2	3	4	5	6	7	8	9

Marks 1.0

Q6 a). In a basic **interval scheduling** implemented using a greedy algorithm, write down the **objective function, feasibility constraints and greedy choice property**

Marks 1.0

b). Use an optimal algorithm to find our how many requests can be catered if the intervals are of requests are: R1 = (0,4); R2 = (5,9); R3 = (11, 13); R4=(3, 6); R5 = (11, 14); R6= (3,7); R7=(8, 10), R8 = (5, 12); R9 = (1,2); Show the steps **Marks 1.0**

Q7. Write a function for a fractional knapsack, assuming that the input arrays to this function have the items already sorted by their pi/wi ratios. The function should return the total profit obtained.

Marks 2.0

```
double GreedyKnapsack (int p[], int w[], int size){
```