[6188]-141

B.E. (Computer Engineering) (Insem)
DESIGN AND ANALYSIS OF ALGORITHMS
(2019 Pattern) (Semester-VII) (410241)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) Answer the questions Q.1 or Q.2; Q.3 or Q.4.
2) Neat diagrams must be drawn wherever necessary.
3) Figures to the right indictae full marks.
4) Assume suitable data, if necessary.

Q1) a) Given the fastest computer and hypothetically infinite memory, do we still need to study algorithms? Justify. **[2]**

b) How can we related algorithms to technology? Briefly explain. **[6]**

c) Consider an array A of n integers which are already in sorted order. Let x be the number being searched in the array A in a liner fashion. The code fragment performing this task is given below: **[7]**

```
int lin _ search (int A [])
{
    i=0; flag=0;
    do { if (x = = A [i]) then
        return (1); // Number found
        else
            i++;
} while (i<n);
    return (0); // Number not found.
}
```

i) Is this code fragment efficient? (We wish to use linear search only). Justify your answer.

ii) Does it attribute to any design issue with respect to iterative algorithm? Briefly explain.

OR

Q2) a) What is iterative algorithm? Explain interative algorithm design issues using suitable examples. **[8]**

b) Consider the following algorithm to find the square of a number:

int sqr(int n)

{

if (n= = 0) return 0;

else return (2n+sqr(n-1)-1)

Prove the correctness of this algorithm using principle of mathematical induction or otherwise. **[7]**

Q3) a) Briefly explain P and NP problems in the context of complexity theory. Give suitable example. **[8]**

b) If $f(n)=O(g(n))$ then does it imply $g(n)=O(f(n))$? Discuss. **[5]**

c) Comment on the statement "Best case analysis of algorithm may not give clear idea of performance". **[2]**

OR

Q4) a) What is SAT AND 3-SAT problem? Prove that 3-SAT problem is NP complete. **[8]**

b) What to do you understand by best case, worst case and average-case behaviour of an algorithm? Is an average case efficiency an average of best-case, worst-case efficiencies? Justify answer. **[7]**

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