Total No. of Questions : 4]

SEAT No. : BC56

P8465

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Oct-22/BE/Insem-41

B.E. (Computer Engineering)

DESIGN AND ANALYSIS OF ALGORITHMS

(2019 Pattern) (Semester - VII) (410241)

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

Instructions to the candidates:

1) *Answer the question of Q.1 or Q.2, Q.3 or Q.4.*
2) *Neat diagrams must be drawn whenever necessary.*
3) *Figures to the right indicate full marks.*
4) *Assume suitable data, if necessary.*

Q1) a) Why correctness of the algorithm is important? Define loop invariant property and prove the correctness of finding summation of n numbers using loop invariant property. **[8]**

b) What is iterative algorithm? Explain iteractive algorithm design issues using examples. **[7]**

OR

Q2) a) How to prove that an algorithm is correct? How to prove the correctness of an algorithm using counter example? Give suitable example. **[7]**

b) Write a short note on any 4 problem solving strategies. **[8]**

Q3) a) What is Best, Average and Worst case Analysis of Algorithms? Analyse the following algorithm Best, Average and Worst case **[8]**

```
void sort (int a. int n) {
   int i, j;
   for (i = 0; i < n; i++) {
      j = i-1;
      key = a[i];
      while (j >=0 && a[j] > key)
      {
         a[j+1] = a[j];
         j = j-1;
      }
      a[j+1] = key;
   }
}
```

P.T.O.

b) • Explain P, NP, NP-Hard and NP-Complete problems with examples.

• Explain 3-SAT problem using an example. Why is SAT so important in theoretical computer science?

[7]

OR

Q4) a) What is NP-complete class problem? How would you prove vertex cover problem is NP-complete class problem? **[8]**

b) What is Best, Average and Worst case Analysis of Algorithms? Analyse the following algorithm Best, Average and Worst case **[7]**

```
int Linear-search(int a, int n, int item) {
  int i;
  for (i = 0; i < n; i++) {
    if (a[i] = = item) {
        return a[i]
    }
  }
  return - 1
```

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