

Total No. of Questions : 4]

PC400

[6359]-520

SEAT No. :

[Total No. of Pages : 2

S.E. (Computer Engineering/ AI & DS/Computer Science)

FUNDAMENTALS OF DATA STRUCTURES

(Insem) (2019 Pattern) (Semester - III) (210242)

Time : 1 Hour]

[Max. Marks : 30

Instructions to candidates:

- 1) Attempt question Q1 or Q2, Q3 or Q4.
- 2) Draw neat & labelled diagrams if necessary.
- 3) Assume suitable data, if necessary.
- 4) Figures to the right side indicates full marks.

- Q1)** a) Discuss any six classes of time complexity with sample code. [6]
- b) Differentiate between: [5]
- i) Static and Dynamic Data structures
 - ii) Persistent and Ephemeral Data Structures
- c) Explain step count method with the help of suitable example. [4]

OR

- Q2)** a) Analyse time complexity of following codes. Show step count for each statement: [6]

- i) function is Prime(n){
 for (i=2;i<n;++i){
 if (n%i == 0){
 return false;
 }
 }
 return true;
}
- ii) Function f()
{
 ans=0
 for (i=n;i>=1;i/=2){
 for (j=1; j <=m; j*=2){
 ans+= (i*j)
 }
 }
 print(ans)
}

P.T.O.

- b) How asymptotic notations play an important role in defining complexity class? Explain Big-Oh, Big-theta and Big-Omega notation with graphs denoting growth rate. [5]
- c) What is algorithmic strategy? Explain divide & conquer and greedy strategy with example. [4]

Q3) a) How can we find transpose of sparse matrix in linear time? Give pseudocode for this method. [6]

- b) Given an array, arr [1.....10] [1.....15] with base value 100 and the size of each element is 1 Byte in memory. Find the address of arr[8] [6] with the help of row-major technique and column major technique. [5]
- c) Compare and contrast row major and column major technique with the help of any matrix. [4]

OR

Q4) a) Write an algorithm to calculate sum of numbers stored in array and illustrate all characteristics of algorithm for the same. [6]

- b) Give a pseudocode for polynomial addition. [5]
- c) What is an ADT? Write ADT operations for array. [4]

