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[5352]-174

**S.E. (IT) (I Sem.) EXAMINATION, 2018**  
**FUNDAMENTALS OF DATA STRUCTURES**  
**(2012 PATTERN)**

**Time : Two Hours**

**Maximum Marks : 50**

**N.B. :—** (i) Answer *four* questions.

(ii) Neat diagrams must be drawn wherever necessary.

(iii) Figures to the right indicate full marks.

(iv) Assume suitable data, if necessary.

**Q 1) a)** Explain logical operators in C with example? [06]

**b)** Explain call by value and call by reference with suitable example? [06]

**OR**

**Q 2) a)** Describe auto, static and register storage classes? [06]

**b)** Write recursive functions for the following: [06]

a. To find factorial of a given positive no.

b. To find sum of digits of given positive no.

**Q 3) a)** Write characteristics of an algorithm? Explain big-oh, omega and theta notations? [06]

**b)** Write algorithm to sort a list of integers using insertion sort. Show output of each pass for the following list: 16, 36, 4, 22, 100, 1, and 54. [06]

**OR**

**Q 4) a)** Differentiate between [06]

1. Primitive and non-primitive data structures

2. Linear and non-linear data structures

**b)** What is sorting? Sort the following elements in ascending order using bucket sort. Show all passes: 121, 8, 235, 055, 973, 97, 327, and 179. [06]

P.T.O.

- Q 5 )**    **a)**    Write algorithm/ C function to find transpose of a sparse matrix using fast transpose algorithm. Analyze its time complexity? [08]
- b)**    Explain sequential and linked memory organization? [06]

**OR**

- Q 6 )**    **a)**    Explain row and column major representation of a matrix? [06]
- b)**    Represent the following polynomial using array [08]
- a.  $X^2 + XY + 2 X^3 Y$
- b.  $3 X^3 + 2 Y^2 X + 5 Y^3 X^3$

- Q 7 )**    **a)**    Write a short note on- [08]
1. CLL
2. DLL
3. SLL
4. Skip list

- b)**    Write a C functions that reverse the SLL using three pointers variables? [04]

**OR**

- Q 8 )**    **a)**    What is generalized linked list? Represent the following lists: [08]
1. (a, b, c, (d, e, f), g, h)
2. (p, (q, r), s, ( t, u), v)
- b)**    Compare SLL and DLL? [04]