

Total No. of Questions : 8]

SEAT No. :

PE4269

[6582]-41

[Total No. of Pages : 2

**S.E. (Computer Engineering) (AI & DS)**  
**FUNDAMENTALS OF DATA STRUCTURES**  
**(2019 Pattern) (Semester - III) (210242)**

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer to the questions (Q.No. 1 or Q.No. 2, Q.No. 3 or Q.No. 4, Q.No. 5 or Q.No. 6, Q.No. 7 or Q.No. 8.)
- 2) Assume suitable data, if necessary.
- 3) Draw neat labelled diagram wherever necessary.
- 4) Figures to the right indicate full marks.

- Q1)** a) Given numbers 49, 47, 37, 29, 26, 10, 65, 78, 21, 49. Sort stepwise using radix sort. When it is appropriate to use radix sort? Write time Complexity.[9]
- b) Write pseudocode/Function for Binary Search algorithm. Explain with suitable example. [9]

OR

- Q2)** a) Write short note on [9]
- i) Binary Search
  - ii) Index sequential search
  - iii) Linear Search
- b) Explain Quick sort technique with suitable solved example. Comment on time complexity. [9]

- Q3)** a) Write pseudo code/function using Doubly Linked List of Employees (Emp-number, name and age stored in every node) for: [9]
- i) Search given Emp\_no and update the age
  - ii) Add given Emp\_no after specified number in the list
- b) Write and explain use of Generalized linked list for representation of multivariable polynomial with suitable example. Explain node structure.[9]

OR

- Q4)** a) How polynomial can be represented using Singly Linked List? Write pseudocode to perform addition of two polynomials using singly linked lists into third list. [9]
- b) Draw and explain structure of Circular Doubly Linked List. What are advantages of Circular Linked List over Singly Linked List? Write pseudocode/function for insertion of a node in Circular doubly linked lists. [9]

P.T.O.

**Q5) a)** What are the rules to convert infix expression to postfix expression using stack. Convert expression  $(E * (F - (G + H * I)) ^ (J * K + L))$  stepwise using above rules.

Where  $^$  is - exponential operator [8]

**b)** Write short notes on [9]

- i) Backtracking
- ii) Tree Recursion
- iii) Tail recursion.

OR

**Q6) a)** What are polish notations? What is the need to convert infix expression into postfix form? Explain postfix evaluation with suitable example. [8]

**b)** Write pseudo-C/C++ code to implement stack using Singly linked list with overflow and underflow conditions. [9]

**Q7) a)** Write short notes on: [8]

- i) Comparison of Linear queue and Circular queue
- ii) Priority queue

**b)** What is Doubly Ended Queue? Which two data structures are combined in it? Explain input restricted and output restricted queue with operations. [9]

OR

**Q8) a)** Write short note on: [8]

- i) Circular Queue using Singly Linked List
- ii) Descending priority queue and its applications

**b)** Draw and explain implementation of Doubly ended Queue using Doubly Linked List. Explain Add, Remove operations. [9]

