Total No. of Questions : 8]

SEAT No. : ____

PC2817

[6352]-41

[Total No. of Pages :3

S.E. (Computer Engineering/Artificial Intelligence & Data Science)

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) Explain with example the following terms related to sorting methods: **[6]**

i) Stability

ii) Number of Passes/Iterations

iii) Sort order

b) Sort given array by using quick sort method **[6]**

25, 23, 18, 19, 21, 17, 28, 20, 16 14. Show step by step execution.

c) Write the algorithm to search an element in array A using binary search technique. Write the complexity of the algorithm for best case worst case and average case. **[6]**

OR

Q2) a) Compare linear search, binary search and sentinel search methods by considering its performance measures. **[6]**

b) Sort given array by using shell sort method **[6]**

50, 23, 18, 9, 01, 70, 21,20, 6,40,03. Show step by step execution.

c) Write pseudocode for Selection sort method. Is this sort stable or unstable? **[6]**

P.T.O

Q3) a) What are advantages of making doubly linked list making circular? Write pseudo code for following function using Doubly Circular Linked List of integer number **[9]**

i) Perform addition of odd numbers in Doubly linked list and insert at start

ii) Delete all even numbers from list

b) Write and explain node structure of Generalized linked list. Represent given Generalized linked list graphically.

(A, B, C, (D, (E, (F), I)), J) **[8]**

OR

Q4) a) Write node structure for polynomial implementation using circular linked list. Write pseudocode to perform addition of two polynomials using circular linked list. Write complexity of it. **[8]**

b) Write and explain node structure of generalized linked list for representing multiple variable polynomials. Represent given polynomial graphically using Generalized linked list. **[9]**

$7x^5 y^2 z^3+13x^3 y^4+30x^9z^8$

Q5) a) What is the necessity of expression conversion? Write pseudocode to convert given infix expression to prefix using stack. **[10]**

b) Explain with example four different types of recursion. **[8]**

OR

Q6) a) Convert given infix expression into postfix expression using stack. Show step by step conversion and evaluation. Evaluate postfix expression using given values. **[10]**

Infix Expression: (A+B^C^D*F/H)

Values for A=4, B=2, C=3, D=2, F=2, H=8

^-exponential operator

b) What is backtracking algorithmic strategy? Explain the use of stack in backtracking strategy with any one application. **[8]**

Q7) a) What are the advantages of Circular Queue over normal queue? Write insert and delete functions for Circular Queue using static memory allocation. **[9]**

b) Explain the Queue implementation using Singly Linked List. Draw diagram with three elements in queue, showing front and rear. scheduling problem using Queue. Write pseudocode for insert and delete operations of above Queue. **[8]**

OR

Q8) a) Explain with example primitive operations of Double ended Queue. **[8]**

b) What are the types of priority queue? Explain any one type of priority queue in detail with example. Mention the time complexity for insert and delete operations on it. **[9]**