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# S.E. (Computer Eugineering A.I \& D.S.) FUNDAMENTALSOF DATA STRUCTURES (2019 Paternit (Semester - III) (210242) 

Time: $2^{1 ⁄ 2} 2$ Hours]
[Max. Marks : 70

## Instructions to the candidates:

1) Answerto 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 QoNo.8).
2) Assume suitable data, if necessary.
3) Drawneat labelled diagram wherever necessary.
4) Figures to the right indicate full marks.

Q1) a) Sort the following numbers step by step lising insertion sort :
$55,85,45,11,34,5,89,99,67$
Comment on time complexity-of Insertion sort
b) Explain in brief any three searching techniques. What is the time complexity of these techniques?

Q2) a) Explain Fibonacci Search algorithm with suitable example. What is.it's time complexity?
b) Givennumbers $29,5 \% 47,39,36,20,55,28,31,39$. Sort stepwise ūsing radix sort. When it is,appropriate to use radix sort? Write ime Complexity.

Q3) a) Write pseudo code for following function using Singly Linked List of students (roll_number and name storedimevery node)
i) Search given roll no and delete that record, Draw diagram of operation.
ii) Add given number after specified number in the list. Draw diagram of operation.
b) Write and explain use of Generalized Tiraked list for representation of multivariable polynomial with seitable example. Explain node structure.

Q4）a）Write pseudocode to perform addition of two polynomials using doubly linked lists into third list．Write time complexity of it．
b）Write and explain node structure of Circular Singly Linked List and Doubly Linked list．Write pseudocode for concatenation of two doubly linked lists．

Q5）a）Write rules to convert given infix expression to postflx expression using stack．Convert expression $\left(\mathrm{P}^{*} \mathrm{Q}-(\mathrm{L}+\mathrm{M} * \mathrm{~N}) \wedge(\mathrm{X} * \mathrm{Y} / \mathrm{Z})\right.$ stepwise using above rules．
Where $\wedge$ is－exponential operator．
b）Explainwith example three different types of recursion．

Q6）a）Explain procedure to convert infix expression to prefix expression and póstfix evaluation with suitable example．
b）Write pseudo－C／C＋＋code to implementstack using Singly linked list with overflow and underfiow conditions．

Q7）a）Draw and explain Circular quepe using array．Write pseudocode for Add， Remove operations
b）What is Doubly Ended Queue？Draw Dragram with labelling four basic operations at appropriate places．Which two data structures are combined in it and how？

Q8）a）Write short note on：
i）Comparison of Circular Queue with Linear queae
ii）Priority Queue
b）Draw and explain implementation of Iinear Queue using Singly Linked List．Explain Add，Remove，Queue Full and Queue Empty operations．［9］

