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Name of Examination : **Winter 2020** - (Preview)

Course Code & Course Name : **CO203U - Fundamentals of Data Structure Programming**

Generated At : **19-04-2022 10:37:13**

Maximum Marks : **60**

Duration : **3 Hrs**

[Edit](#) [Print](#) [View Answer Key](#) [Close](#) **Answer Key Submission Type:** Marking scheme with model answers and solutions of numerical

Instructions:

1. All questions are compulsory.
2. Illustrate your answer with suitable figures/sketches wherever necessary.
3. Assume suitable additional data; if required.
4. Use of logarithmic table, drawing instruments and non programmable calculators is allowed.
5. Figures to the right indicate full marks.

1) Solve all sub-questions

- a) List all the applications of stack. [2]
- b) Define Data Structure. Give the classification of Data Structure. [2]
- c) Enlist all applications of queue. [2]

2) Solve any three sub-questions

- a) Write an algorithm for PUSH and POP operations on stack. [6]
- b) Describe the concept of sparse matrix with example and array representation. [6]
- c) Write an algorithm for conversion of infix to postfix expression and show stack steps for conversion of the infix expression $(P/(Q-R)*S+T)$ to postfix expression. [6]
- d) Write the procedure for binary search. Consider the following list of elements 10,12,20,32,50,55,65,80,99 and the element to be searched is 12. Perform binary search on the given list and show all the steps. [6]

3) Solve any three sub-questions

- a) Differentiate between internal and external sorting. Explain which type of sorting is suitable for bubble sort and merge sort. Justify. [6]
- b) Write an algorithm for insertion and deletion operation on queue. [6]
- c) Write the steps for merge sort and perform it on 38,27,43,3,9,82,10. [6]
- d) Convert following expression infix expression to postfix expression [6]
 - i) $A + B * C + D$
 - ii) $(A + B) * (C + D)$
 - iii) $A * (B + C) * D$
 Convert following expression infix expression to prefix expression
 - iv) $x^y/(5*z)+2$
 - v) $A * B + C / D$
 - vi) $((b-c)/((p-q)+r))$

4) Solve any three sub-questions

- a) Write a procedure for evaluating postfix expression and show the stack steps for evaluating the expression $234+*5*$ [6]
- b) Perform bubble sort on 5, 1, 4, 2, 8 and show all passes. [6]
- c) Write a C program to search an element in an array using linear search. [6]
- d) Explain any two types of queue with diagram in detail. [6]

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