

(i) Printed Pages: 3

Roll No.

(ii) Questions : 9

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Bachelor of Computer Applications 3rd Semester
(2123)

DATA STRUCTURES

Paper : BCA-16-305

Time Allowed : Three Hours] [Maximum Marks : 65

Note :—Attempt **one** question from each unit and the compulsory question. All questions carry equal marks unless specified.

UNIT-A

1. Write an algorithm to find the location LOC and the value MAX of the largest element in an array A with n elements. Consider the complexity function C(n) which measures the number of times LOC and MAX are updated. Describe and find C(n) for the best, worst and average case (when $n = 3$).
13
2. Write an algorithm to transform infix expression into postfix expression. Consider the following arithmetic infix expression Q :

$$Q : A + (B * C - (D/E^F)/G) * (H + I * J)$$

- (a) Transform Q into its equivalent postfix expression P.
- (b) Evaluate the postfix expression P using stack. 13

UNIT-B

3. (a) Write an algorithm to reverse the contents of a linked list. 6
- (b) What is circular header linked list ? Write an algorithm to delete last element in circular linked list. 7
4. Suppose a queue is maintained by a circular array QUEUE with $N = 12$ memory cells. Find the number of elements in QUEUE if :
- (a) FRONT=4, REAR=8
- (b) FRONT=10, REAR=3
- (c) FRONT=5, REAR=6 and then two elements are deleted. 13

UNIT-C

5. Consider the following elements :
- 40, 30, 25, 67, 11, 37
- (a) Draw Binary Search Tree T of the above elements.
- (b) Write algorithm to find the location LOC of ITEM in T or inserts ITEM as a new node in T.
- (c) Obtain the complexity of algorithm (b). 13
6. Discuss various operations on graphs like searching, insertion and deletion of a node N using linked list. 13

UNIT-D

7. Consider the following elements :

88, 22, 40, 15, 30, 25, 67, 11, 37

(a) Search element 30 using Linear search and write its complexity.

(b) Search element 20 using Linear search and write its complexity. 13

8. Compare various sorting techniques on the basis on their complexities. 13

(Compulsory Question)

9. (i) What is space and time complexity trade-off ? 3

(ii) Define Big Oh Notation. 2

(iii) What is doubly linked list ? 2

(iv) Differentiate between pre-order and post-order traversal techniques. 3

(v) Differentiate between BFS and DFS traversal techniques. 3