



Data Structures (174113 / 224113)

P. Pages : 2

Time : Three Hours

Max. Marks : 80

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Attempt **any two** sub-questions from each unit.
5. Assume suitable data wherever necessary.
6. Draw neat diagrams wherever necessary.
7. Figures to the right indicate full marks.

UNIT – I

1. a) Define and explain the concept of data, data type, data object and data structure with suitable example. **8**
b) Explain the types of data structure in detail. Also explain all data structure operations with justification. **8**
c) Write and explain program for the use of the array, along with justification for its declaration and initialization (compile time and run time). Also write and explain program for the use of pointers with suitable example. **8**

UNIT – II

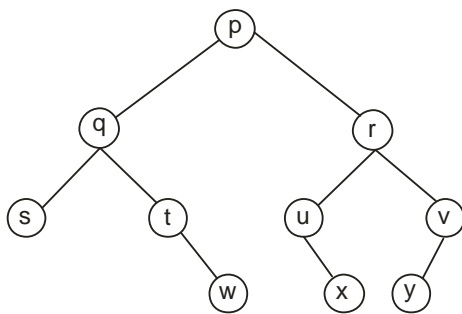
2. a) Write and explain data structure for circular queue. Also mention about the insert and delete procedures properly. Justify with suitable example of 5 elements circular queue. State its advantages & disadvantages. **8**
b) Write and explain the algorithm for conversion of postfix expression to infix form. Justify the same for following example. $PQR \cap | ST^* + PR^* -$. **8**
c) Explain the concept of multiple stack and priority queue with suitable example of each. **8**

UNIT – III

3. a) Write and explain the algorithm for searching a specific item of information through single linked list. Justify with example. 8
- b) Write short notes on following. 8
- Memory allocation and garbage collection.
 - Generalized list.
- c) Explain two-way list with example. Write and explain algorithm for inserting new node in a two-way list and deleting a node from a two-way list. Justify with example. 8

UNIT – IV

4. a) Explain the concept of AVL search tree. State it's advantages. Define balance factor. Explain Rebalancing rotations LL, LR, RR and RL. with example of each. 8
- b) Write and explain the algorithm for inorder traversal of tree using stack. Justify in detail (with contents of stack after every step) with below example. 8



- c) Explain with example : 8
- Two-way inorder threading with header node
 - Huffman tree for the weights 22, 5, 11, 19, 2, 11, 25, 5.

UNIT – V

5. a) What is Hashing ? Explain hash functions like division method, mid-square method and folding method. Apply the same to the keys 3205, 7148, 2345 and 6789. 8
- b) Explain the concept of complexity of algorithms (worst case, average case and best case). Also explain Big 'O' notation, omega notation (Ω) and theta notation (θ) with example. 8
- c) Explain following : 8
- Quick sort and apply it on
44, 33, 11, 55, 77, 90, 40, 60, 99, 22, 88, 66.
 - Merge sort and apply it on :
66, 33, 40, 22, 55, 88, 60, 11, 80, 20, 50, 44, 77, 30.
