B.E. / B.Tech. Electrical (Electronics & Power) Engineering (Model Curriculum) Semester-VI

TE203A / DATA1 - Data Structures and Algorithms

P. Pages : 2 **GUG/S/25/13875**

Time : Three Hours * 2 3 1 0 * Max. Marks : 80

Notes : 1. All questions are compulsory.
2. All questions carry equal marks.
3. Assume suitable data wherever necessary.
4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) State and explain Asymptotic Notations. **8**

b) Explain working of Binary search with its algorithm and example. **8**

OR

2. a) Consider an array A={14, 35, 7, 10, 56, 22, 13, 8, 42} and key={22}. Apply linear search to find the key value and explain its complexity. **8**

b) Explain algorithm complexity (time and space) with an example. **8**

3. a) Explain linked list with needs (with an example). Also state the advantages and disadvantages of linked list. **8**

b) Illustrate circular linked list with a neat sketch by inserting items : **8**
4, 6, 10, 12, 42, l00
After inserting above items delete the first and last item of the list and show the updated list.

OR

4. a) Differentiate between singly and doubly linked list. Insert the items in the doubly linked list : 23, 42, 82, 92, 72 and then show the deletion from the end in above list. **8**

b) Write algorithm for deletion at particular position in singly linked list and explain it with the help of example. **8**

5. a) State and explain applications of stack in detail. **8**

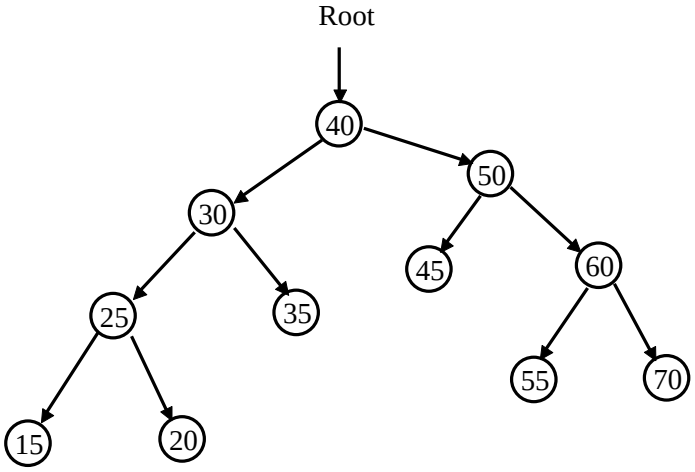
b) Explain need of circular queue. A circular queue of size initially has F=R=-1. **8**
Perform the following operations and track the value of front and rear after each operations.
Insert 10, insert 20, insert 30, delete an element, insert 40, insert 50, insert 60
Illustrate with neat sketch.

OR

6. a) Convert following expression into postfix by using stack. **8**
i) $(x \wedge y / (a * z) + b)$
ii) $A - (B / C + (D \% E * F) / G) * H$

b) Write algorithm for enqueue and dequeue operations and explain each with example. **8**

7. a) Find the preorder of below tree: **8**



b) Define BST and create BST by using following elements: **8**
45, 15, 79, 90, 10, 55, 12, 20, 50

OR

8. a) Construct an AVL tree for following elements: **8**
H, I, J, B, A, E, C, F, D, G, K, L

b) Write a short note threaded binary tree. **8**

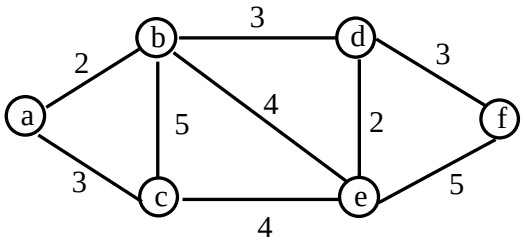
9. a) Sort the below items using quick sort: **8**
45, 23, 78, 12, 34, 56, ll, 89, 21, 32, 67, 90, 10, 29, 61

b) Explain working of heapsort (max heap) with following elements: **8**
31, 89, 9, 11, 14, 76, 54, 22

OR

10. a) Explain BFS with suitable example. **8**

b) Create minimum spanning tree using prim's algorithm: **8**



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