EVEN 2024-25 IT23104 / CO23104

GOVERNMENT POLYTECHNIC MUMBAI
TERM END EXAMINATION

Programme : **Computer Engineering (Sandwich Pattern)**
Course Title : **Data Structures**

2:30 Hours / 60 marks Enrolment No. 2524 1F046

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***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

Q.1 Attempt any SIX **12 Marks**

a. State data structure. List its needs (any 2 needs). **[CO-1, L-R]**
b. State abstract data type. Give one example. **[CO-1, L-R]**
c. List applications of block chain (any four). **[CO-4, L-R]**
d. State the condition for overflow and underflow of singly link list. **[CO-4, L-R]**
e. List any two applications of queue. **[CO-3, L-R]**
f. List difference between depth first search and breadth first search (any 2 points). **[CO-4, L-R]**
g. Define graph. Give one example of graph. **[CO-4, L-R]**
h. Define sorting. List its types. **[CO-5, L-R]**
i. List any two differences between linear search and binary search. **[CO-5, L-R]**

Q.2 Attempt any THREE **12 Marks**

a. Explain classification of data structures with suitable diagrams. **[CO-1, L-U]**
b. List differences between singly linked list and doubly linked list (any 4 points). **[CO-4, L-A]**
c. List different applications of stack. Explain any one application in detail. **[CO-2, L-U]**
d. Define queue. Explain insert and delete operation in simple queue. **[CO-3, L-U]**

Q. 3 Attempt any THREE **12 Marks**

a. Explain PUSH and POP operation of stack with proper example. **[CO-2, L-U]**
b. Explain in detail priority queue. **[CO-3, L-U]**
c. Describe given tree terminologies with suitable example i) Height of node ii) Depth of node iii) Leaf node iv) Subtree. **[CO-4, L-A]**
d. Describe binary search with suitable example. **[CO-5, L-U]**

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Q. 4 Attempt any FOUR **12 Marks**

a. List operations on data structures. Explain in detail any two operations. **[CO-1, L-U]**

b. Explain following terms i) Node ii) Null pointer iii) Empty linked list. **[CO-4, L-U]**

c. Explain following terms of stack i) Overflow ii) Underflow iii) Top of a stack. **[CO-2, L-U]**

d. Describe the terms related to graph i) Vertices ii) Edge iii) Directed graph. **[CO-4, L-A]**

e. Write a c program for linear search. **[CO-5, L-A]**

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Q. 5 Attempt any TWO **12 Marks**

a. Explain in detail insertion of a node in singly linked list (At front, In between, At the end). **[CO-4, L-U]**

b. With suitable example explain in order, pre order and post order traversing. **[CO-4, L-U]**

c. A = [4,12,7,1,3,10,5,14,2,20]. Arrange elements of above array using bubble sort and selection sort. Elaborate each step. **[CO-5, L-A]**

****End****

L4
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4
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