Reg. No. :

Question Paper Code : X67536

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020
Third Semester
Computer Science and Engineering
CS 1201 – DATA STRUCTURES
(Common to Electronics and Communication Engineering, Electrical and Electronics Engineering, Instrumentation and Control Engineering, Electronics and Instrumentation Engineering, Information Technology, Petrochemical Technology)
(Regulations 2008)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. What is meant by time complexity and space complexity of an algorithm ?
2. Define big O natation.
3. How is a circular queue implemented in a linear array ?
4. Is it easier to insert a new node before or after a specified node in a linked list ? Why ?
5. Inorder traversal of a binary tree produces DBEFCA. What is its correct preorder traversal ?
6. Define hashing.
7. Write any two graph applications.
8. Define a flow problem.
9. Write about freeing list nodes.
10. Define Garbage collection.

PART – B **(5×16=80 Marks)**

11. a) i) Estimate the average case, best case and worst case time complexity of linear search. **(8)**

ii) Discuss the amortized time complexity analysis with an example. **(8)**

(OR)

b) i) Explain different types of analysis that can be performed on an algorithm. **(8)**

ii) Explain the various asymptotic notations. **(8)**

12. a) Write an algorithm to delete the node p from a linked list when you are given only the pointer p without second pointer in lock step. **(8+8)**

i) Use the device of copying information fields from one node to another in designing your algorithm.

ii) Will your algorithm work when p is the first or the last node in the list ? If not, either describe the changes needed or state why it cannot be done without providing additional information to your algorithm.

(OR)

b) For a stack write the steps of implementing an algorithm for the evaluation of the postfix expression given below **(16)**

x = 6 2 3 + – 3 8 2 / + * 2 $ 3 +

and find the value of x.

13. a) i) Write an algorithm for a two way merge sort using a linked allocation technique. **(8)**

ii) Distinguish between Internal sorting and External sorting with relevant examples. **(8)**

(OR)

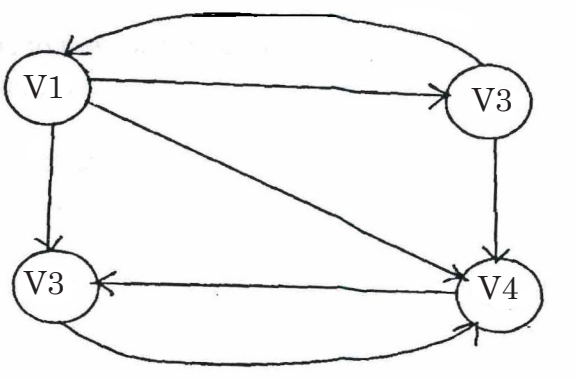
b) i) Write an algorithm.

1) to delete an item from hash table. **(5)**

2) to insert an item into a hash table. **(5)**

i) Show the representation of list as binary tree. **(6)**

14. a) Consider a graph G as shown below :



i) Write the Warshall's algorithm. **(4)**

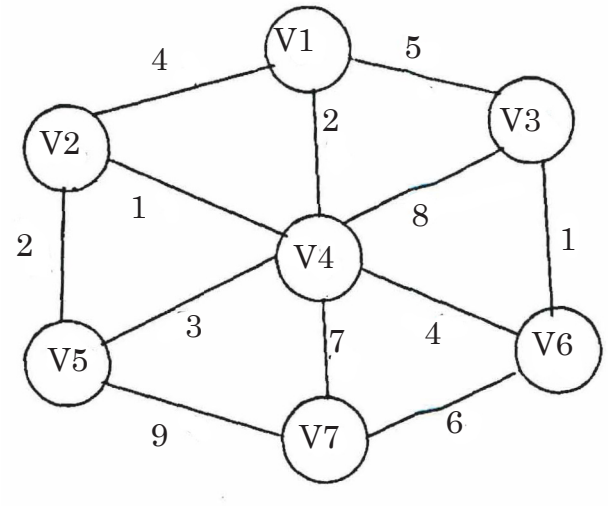
ii) Find the path matrix of G using Warshall's algorithm. **(4)**

iii) From the path matrix, obtain all elementary paths from any vertex to other. **(4)**

iv) Can you conclude about any cycle in the graph from the path matrix P as obtained by you. **(4)**

(OR)

b) i) What is a minimum spanning tree ? Write Kruskal's algorithm and trace down its steps to obtain a minimum spanning tree for the following graph : **(10)**



ii) Write an algorithm to calculate the number of edges in a directed graph using linked representation. **(6)**

15. a) Write a note on the following in detail : **(16)**

i) Linked list representation

ii) General lists.

(OR)

b) Explain the automatic list management and its essentials of a database in detail. **(16)**