Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 97044

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Third Semester

Computer Science and Engineering

CS 6301 — PROGRAMMING AND DATA STRUCTURES — II

(Common to Computer and Communication Engineering and Information Technology)

(Regulation 2013)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define data abstraction.

2. Write a member function to find the greatest of two numbers using 'this' pointer.

3. Mention any four operators of C++ that cannot be overloaded.

4. What are pure virtual functions? Give example.

5. Give an example on function template.

6. What is the significance of Iterators?

7. Define Fibonacci heaps.

8. What is meant by amortized analysis?

9. Give the ways in which a graph can be represented with an example.

10. Define minimum spanning tree.

PART B — (5 × 16 = 80 marks)

11. (a) (i) List the different types of constructors. Write a program to illustrate the use of different types of constructors. (10)

(ii) Brief on the features of C++ programming language. (6)

Or

(b) (i) Explain the ways in which member functions of a class can be defined and called using a suitable example. (10)

(ii) Explain with an example the use of static members. (6)

12. (a) (i) Write a program to perform string copy operation using dynamic constructor. (6)

(ii) Consider the following arithmetic expressions :

C = 2 + B and K = S – T, where B, C, K, S and T are the objects of a class called '1DArray'. Write a program to perform these operations by overloading the + and – operators appropriately. (10)

Or

(b) (i) Write a program to perform dynamic initialization of objects. (6)

(ii) Write a program to illustrate the process of multi-level multiple inheritance concept of C++ language. (10)

13. (a) (i) Write a program to illustrate the concept of re-throwing an exception. (8)

(ii) Write a program to read a string to store it in a file and read the same string from the file to display it on the output device. (8)

Or

(b) (i) What is a STL? Brief on its key components and their types. (8)

(ii) Write a function template to find the minimum value contained in an array. (8)

14. (a) (i) What is a Red-Black tree? Mention the properties that a Red-Black tree holds. (6)

(ii) Show the results of inserting 43, 11, 69, 72 and 30 into an initially empty AVL tree. Show the results of deleting the nodes 11 and 72 one after the other of the constructed tree. (10)

Or

97044

(b) (i) What is a B-tree? Mention the properties that a B-tree holds.   (6)

(ii) Construct a binary search tree by inserting 30, 10, 4, 19, 62, 35, 28, 73 into an initially empty tree. Show the results of splaying the nodes 4 and 62 one after the other of the constructed tree.   (10)

15. (a) (i) Write an algorithm for breadth first search on a graph and give the nodes of the graph 'G' given in fig.15(a) based on the algorithm.   (6)

(ii) Using Dijiktra's algorithm, find the shortest path from the source to all other nodes of the graph 'G' given in fig.15(a).   (10)
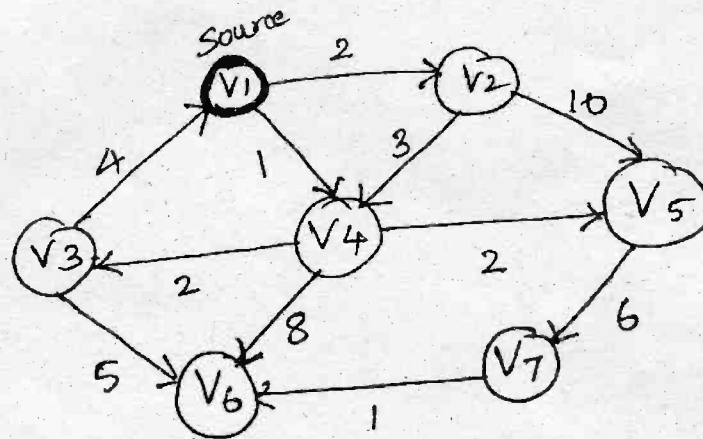

Fig. 15(a)

Or

(b) (i) Illustrate the working of Warshall's algorithm.   (6)

(ii) Consider a directed acyclic graph 'D' given in fig.15(b). Sort the nodes of 'D' by applying topological sort on 'D'.   (10)
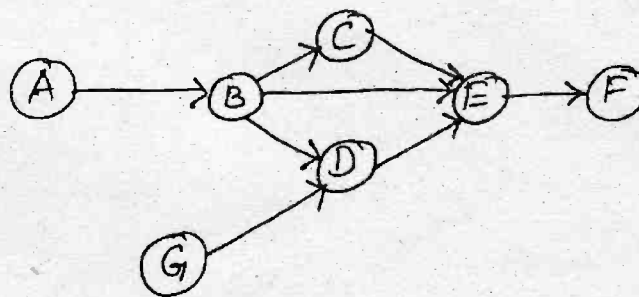

Fig. 15(b)

————————

3   97044