

Reg. No. :

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Question Paper Code: U4826

B.E./B.Tech. DEGREE EXAMINATION, APRIL 2024

Fourth Semester

Biomedical Engineering

21UIT426 -DATA STRUCTURES USING OBJECT ORIENTED PROGRAMMING

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (10 x 2 = 20 Marks)

1. List the rules for identifiers in C++ with example? CO1-U
2. How to create an object and access a class member with an example? CO1-U
3. Write a simple C++ program to swap two numbers using call by reference. CO2-App
4. Differentiate compile and run time polymorphism. CO1-U
5. What is the postfix form of this expression? $(A+B)*(C/D)$. CO2-App
6. Why is a doubly linked list more useful than a singly linked list? Justify your answer. CO3-Ana
7. How many nodes will a complete binary tree with 27 nodes have in the last level? What will be the height of the tree? CO2-App
8. Differentiate binary tree and binary search tree. CO1-U
9. Categorize the collision resolution strategies. CO1-U
10. What is the output of selection sort after the 2nd iteration given the following sequence? 16 3 46 9 28 14 CO2-App

PART – B (5 x 16= 80 Marks)

11. (a) (i) Write a C++ program to calculate the average of all the elements present in an array. CO2-App (8)
(ii) Write a C++ program to add two numbers using function. CO2-App (8)

Or

- (b) Write a C++ program to demonstrate with the static data members and member functions. CO2-App (16)
12. (a) Write a C++ code to construct classes of a person with name and age as public properties, account details as private properties and percentage of marks as protected property. Construct a class with sports details of person. Construct a class to rank person based on the equal weight age to academic and sports details. Use inheritance concept. CO2-App (16)

Or

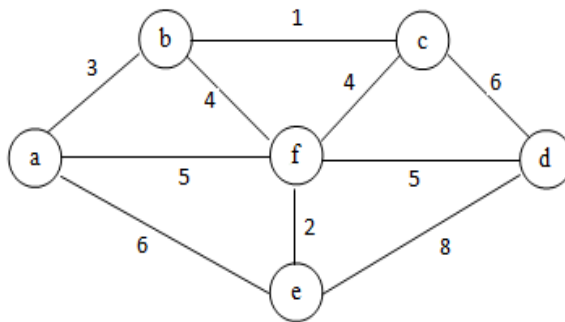
- (b) (i) Write a C++ program to find the maximum element in an array using function templates. CO2-App (8)
- (ii) Write a C++ program to handle a divide by zero exception. CO2-App (8)
13. (a) Write a C++ program to perform various operations on stack ADT using linked list representation. CO2-App (16)

Or

- (b) Write an algorithm and diagrammatic illustrations the various operations that can be performed on a Queue ADT using array representations. CO2-App (16)
14. (a) Construct an AVL tree and apply various rotation techniques for the following values 15, 20, 24, 10, 13, 7, 30, 36, 25. CO2-App (16)

Or

- (b) Write a Kruskal's algorithm and to find out the minimum spanning tree for the following graph. CO2-App (16)



15. (a) Write a routine for merge sort and explain in details. Sort the following sequence using merge sort: 12, 31, 25, 8, 32, 17, 40, and 42. CO2-App (16)

Or

- (b) Consider a hash table with 9 slots. The hash function is $h(k) = k \text{ mod } 9$. The following keys are inserted in the order 15, 38, 8, 5, 20, 33, 14, 30. Draw the contents of the hash table when the collisions are resolved by using open addressing hash table. CO2-App (16)

