

# RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. THIRD SEMESTER EXAMINATION, DECEMBER 2019

SECOND YEAR [BATCH 2018-21]

COMPUTER SCIENCE (Honours)

Date : 13/12/2019

Time : 11 am – 1 pm

Paper : III [Gr- B]

Full Marks : 35

## Unit-I

Answer **any one** question from Question Nos. **1 & 2:**

[1×5]

1. a) Justify the statement — “ int n[10]={};” (2)  
b) Explain constant or read – only variable with a suitable example. (1)  
c) “ C++ passes arrays to function by value” – Justify the statement. (2)
2. a) “One array can’t be assigned to another with the assignment operator” – why? (2)  
b) What are the differences between array and vector? (2)  
c) What do you mean by “ int display (...);” (1)

Answer **any one** question from Question Nos. **3 & 4:**

[1×10]

3. a) State the situations where inline function may not work. (2)  
b) Explain nesting of member function with a suitable example. (2)  
c) State the properties of static data members. (1)  
d) Explain array of objects with a suitable example. (2)  
e) What is dereferencing operator? Give example of its uses. (2)  
f) Write the properties of destructor? (1)
4. a) State the rules for function overloading. (4)  
b) Explain the concept of namespace. (3)  
c) What is template? (2)  
d) What is copy constructor? (1)

## Unit-II

Answer **any two** questions from Question **5 to 8:**

[2×10]

5. a) Explain the Hash function. What is linear & quadratic probing? (3+3)  
b) Explain the idea of Universal Hashing. (2)  
c) Give the difference between DFS and BFS. (2)

6. a) Show the AVL tree that results after each of the integer keys 9, 27, 50, 15, 2, 21, and 36 are inserted, in that order, into an initially empty AVL tree. Clearly show the tree that results after each insertion and make clear any rotations that must be performed.
- b) What are B-trees? Construct a B-tree of order 3 for the following set of  
Input Data: 69, 19, 43, 16, 25, 40, 132, 100, 145, 7, 15, 18. (5+5)
7. a) Show the red-black tree that results after each of the integer keys 2, 1, 4, 5, 9, 3, 6 and 7 are inserted, in that order, into an initially empty red black tree. Clearly show the tree that results after each insertion and make clear any rotations that must be performed.
- b) The preorder traversal sequence of a binary search tree (BST) is 30, 20, 10, 15, 25, 23, 39, 35, 42. Construct the BST. (5+5)
8. a) A file contains the following characters with the frequencies as shown. If Huffman Coding is used for data compression, determine Huffman Code for each character and Length of Huffman encoded message (in bits)

|             |    |    |    |   |   |    |   |
|-------------|----|----|----|---|---|----|---|
| Characters  | a  | e  | i  | o | u | s  | t |
| Frequencies | 10 | 15 | 12 | 3 | 4 | 13 | 1 |

- b) Briefly discuss the Heapify and Build heap procedure and also mention their respective time complexity. (5+(2.5+2.5))

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