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Question Paper Code: 53826

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Third Semester

Electronics and Communication Engineering

15UIT326-DATA STRUCTURES AND ALGORITHM ANALYSIS

(Regulation 2015)

Duration: 1.15 hrs

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. When one object reference variable is assigned to another object reference variable then CO1- R
 - (a) a copy of the object is created.
 - (b) a copy of the reference is created.
 - (c) a copy of the reference is not created.
 - (d) it is illegal to assign one object reference variable to another object reference variable
2. Which of the following concepts means wrapping up of data and functions together? CO1-R
 - (a) Abstraction
 - (b) Encapsulation
 - (c) Inheritance
 - (d) Polymorphism
3. Which of the following is not correct for virtual function in C++? CO2- R
 - (a) Must be declared in public section of class
 - (b) Virtual function can be static
 - (c) Virtual function should be accessed using pointers
 - (d) Virtual function is defined in base class
4. Which of the following ways are legal to access a class data member using this pointer? CO2- R
 - (a) this->x
 - (b) this.x
 - (c) *this.x
 - (d) *this-x
5. The result evaluating the postfix expression $10\ 5\ +\ 60\ 6\ /\ * 8 -$ is CO3- App
 - (a) 284
 - (b) 213
 - (c) 142
 - (d) 71

6. Which of the following is two way lists? CO3- R
- (a) Grounded header list (b) Circular header list
 (c) Linked list with header and trailer nodes (d) List traversed in two directions
7. The height of a binary tree is the maximum number of edges in any root to leaf path. The maximum number of nodes in a binary tree of height h is: CO4- U
- (a) $2^h - 1$ (b) $2^{(h-1)} - 1$ (c) $2^{(h+1)} - 1$ (d) $2 * (h+1)$
8. What are the balance factors in AVL trees? CO4- R
- (a) 1,-1,0 (b) -2,-1,0 (c) 1,2,3 (d) 2,-1,1
9. If the array is already sorted, then the running time for merge sort is: CO5- R
- (a) $O(1)$ (b) $O(n * \log n)$ (c) $O(n)$ (d) $O(n^2)$
10. Which of the following is not a stable sorting algorithm in its typical implementation? CO5- R
- (a) Insertion Sort (b) Merge Sort (c) Quick Sort (d) Bubble Sort

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Specify a class called complex to represent complex numbers. Overload +, -, *, and / operators when working on the objects of this class. CO1- U (8)
12. Write a C++ program to define a class called patient(name, age, sex). Derive two classes from patient namely in-patient(ipno, date-of-admin, date-of-discharge) and out-patient (opno, doctor-id and consultation-fee). Define two classes namely general-ward(rent/day) and special-ward(roomno, rent/day, eb-bill). For out-patient print the bill with consultation fee. For in-patients, print bill according to their accommodation either in general-ward or special-ward. CO2- Ana (8)
13. Given two sorted lists, L1 and L2, write procedure to compute L1 U L2 and L1 using only the basic list operations. CO3- Ana (8)
14. Write an insertion and deletion algorithm for binary search tree. Insert 17,21,13,15,10,16,4,24,27,23,11,25,26 into a initially empty binary search tree. Delete 4, 10, 27 and 13 from the tree. CO4- App (8)
15. Write an algorithm to sort a set of 'N' numbers using Quick sort. Trace the algorithm for the following numbers : 2, 13, 45, 56, 27, 18, 24, 30, 87 and 9 CO5- App (8)