Mark Scored:

KATHMANDU UNIVERSITY
End Semester Examination
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Level : B. E./B. Sc.
Year : III
Course : COMP 314
Semester : II

Exam Roll No. :
Time: 30 min
F. M. : 10

Registration No.:
Date :

SECTION "A"
[20 Q × 0.5 = 10 marks]

Select the best answer among the given choices.

1. The elements of an array are stored successively in memory cells because:
   a. by this way computer can keep track only the address of the first element and the addresses of other elements can be calculated
   b. the architecture of computer memory does not allow arrays to store other than serially
   c. both of the above
   d. None of the above

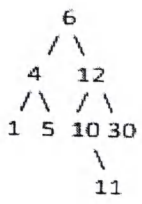
2. Each array declaration need not give, implicitly or explicitly, the information about:
   a. The name of the array
   b. The data type of the array
   c. The first data from the set to be stored
   d. The index set of the array

3. The operation of processing each element in the list is known as:
   a. Sorting
   b. Merging
   c. Insertion
   d. Traversal

4. The indirect change of the values of a variable in one module by another module is called:
   a. Internal change
   b. Inter-module change
   c. Side effect
   d. Side-module update

5. What is the worst-case time for a binary search finding a single item in an array?
   a. Constant time
   b. Logarithmic time
   c. Linear time
   d. Quadratic time

6. Consider the following tree:



   If the above tree is used for sorting, then a new number 8 should be placed as the:
   a. Left child of the node labeled 30
   b. Right child of the node labeled 5
   c. Right child of the node labeled 30
   d. Left child of the node labeled 10

7. Traversing a binary tree first root and then left and right subtrees is called:
   a. Postorder traversal
   b. Preorder traversal
   c. Inorder traversal
   d. Depth-First traversal

8. The condition Top = -1 indicates that:
   a. Stack is empty
   b. Stack is full
   c. Stack has only one element
   d. None of these

9. An algorithm must be generic enough to solve all problems of a particular class. Which of the following relates to this property of algorithms?
   a. Finiteness
   b. Definiteness
   c. Generality
   d. Effectiveness

10. A mathematical model with a collection of operations defined on that model is called:
   a. Data structure
   b. Abstract Data Type
   c. Primitive Data Type
   d. Algorithm

11. In case of a chained hash table of n elements with b buckets, assuming that a worst case resulted in all the n elements getting mapped to the same bucket, then the worst case time complexity of a search on the hash table would be given by:
   a. O(1)
   b. O(n/b)
   c. O(n)
   d. O(b)

12. Find the odd one out:
   a. O(n)
   b. $O(n^2)$
   c. $O(n^3)$
   d. $O(3^n)$

13. A balanced binary tree is a binary tree in which the heights of the two subtrees of every node never differ by more than:
   a. 2
   b. 1
   c. 0
   d. None of the above

14. The element at the root of a heap is :
   a. largest
   b. smallest
   c. depending upon the type of the heap, it may be smallest or largest
   d. None of the above.

15. Which of the following represents a cross edge?
   a. (u, v) where u and v are not ancestors or descendents of one another.
   b. (u, v) where v is a (not necessarily proper) ancestor of u in the tree.
   c. (u, v) where v is a proper descendent of u in the tree.
   d. None of the above

16. The running time of Prim's algorithm is:
   a. $O((V+E)^2 \log V)$
   b. $O(V \log V)$
   c. $O(E \log V)$
   d. $O(V^2)$

17. The running time of Dijkstra's algorithm is :
   a. O(V2)
   b. O(E lg V)
   c. O(V+E)
   d. O(V.E)

18. In a heap with n elements and with the smallest elements at the root, the 7'th smallest element can be found in:
   a. $\Theta(n \lg n)$
   b. $\Theta(n)$
   c. $\Theta(\lg n)$
   d. $\Theta(1)$

19. A connected graph T without any cycles is called:
   a. a tree graph
   b. a free tree
   c. a tree
   d. All of the above

20. Which of the following is not true of Flow networks?
   a. Flow in is equal to Flow out in the vertices other than the source and the sink.
   b. $f(u,v) = - f(v,u)$
   c. $f(u,v) <= c(u,v)$
   d. Capacity can have zero or negative values