1. $(1010.1110)_2$ = (_____)$_{10}$

A)10.875 B) 9.456 C)11.657 D)4.2345

2. $(AABC)_{16}$ = (_____)$_8$

A)123456 B)127890 C)125274 D)324512

3. If f(n) = Θ(g(n)) and g(n) = Θ(h(n)), then h(n) = Θ(f(n))

A) True B) false C) depends on the value of f(n) D) depends on the value of g(n)

4. n/100 = Ω (n)

A) True B) false

5. 1,2,3,4,5 is pushed in an empty stack in the given order, then four times pop operation is done. After each pop operation element is enqued in an empty queue. Then there are two deque operation done and after each dequeue elements are pushed in the stack. Topofstack() will return

A) 1 B) 2 C) 3 D) 4 E) 5

6. There are 20 people who work in an office together. Four of these people are selected to attend four different conferences. The first person selected will go to a conference in New Delhi, the second will go to Kolkata, the third to Chennai, and the fourth to Mumbai. How many such selections are possible?

A) 116280 B) 80 C) 4845 D) none of these

7) We interchange values of variables m and n, using replacement notation by t← m, m← n, n← t. So we use three assignments. If we want to rearrange (a,b,c,d) to (b,c,d,a) by a sequence of replacements. The new value of a is to be the original value of b & so on. How many assignments are required?

A) 3 B) 5 C) 4 D) 6

8. The sequence of steps Fetch Phase of the Fetch-decode-execute follows is

a. The contents of PC are transferred to MAR

b. Main memory is accessed

c. Current instruction is fetched into MBR

d. Instruction is transferred from MBR to IR

A. acbd B. abdc C. abcd D. dcba

9. What will be the output of the following program

```
main()
{
int i=0,x=0;
for(i=1;i<10;++i)
{
if(i%2 == 1)
x += i;
else
```

```
x--;
printf("\n%d",x);
break;
}
printf("\nx=%d",x); }
```

A. 1 1 B. 5 5 C. 10 1 D. 10 10

10 . Out of different analysis paradigms normally we choose

a) macro, apriori, worst case and asymptotic analysis

b) micro, posterior, average case and empirical analysis

c) macro,posterior, worst case and asymptotic analysis

d) micro, apriori, worst case and empirical analysis

11. Front(Enqueue(New(),v))=?

A) v B) new() C) Front(New()) D) X

12. The minimum time complexity algorithm to find the nth Fibonacci Number in the Fibonacci series is

A) $O(n^2)$ B) O(n) C) O(log n) D) 2^n

13. Convert (A-B)*(D/E) into a postfix expression

A) AB-DE/* B) A*BD/E- C) ABDE-/* D) /-ABDE E) AB/DE-*

14. Sparse matrices can be better represented by

A) Doubly Linked List B) Orthogonal Circular Link List C) Array D) Binary Search Tree

15. We are hashing some elements into the given array and the current position is given below, if the hashing function is x mod 20 and we are using linear probing of the type (x+1)%N, (x+3)%N, (x+5)%N …(x+2*i+1)%N then the element 203 will be inserted at position

1	2	3	4	5	6	7	8	9	10
41		123	44		6		168		

A) 2 B) 5 C) 7 D) 10

16. If insertion sort runs in $8n^2$ steps and merge sort runs in 64nlgn steps, for which values of n does insertion sort becomes slower than merge sort

A) 8 B) 32 C) 64 D) 128

17. For recurrence T(n) = T(n-1) + n what will be the big oh complexity.

A) O(n) B) O(nlogn) C) $O(n^2)$ D) $O(2^n)$

18. The terminal nodes of a binary tree occur in the same relative position in a) preorder b) inorder c) postorder

A) a & b & c

B) b& c only

C) c& a only

D) a & b only

19. Suppose that we have numbers between 1 and 1000 in a binary search tree, and we want to search for the number 363. Which of the following sequences could not be the sequences of nodes examined.

A. 2, 252, 401, 398, 330, 344, 397, 363

B. 924, 220, 911, 244, 898, 258, 362, 363

C. 925, 202, 911, 240, 912, 245, 363

D. 2, 399, 387, 219, 266, 382, 381, 278, 363

20. Expression $2^{n+1} = O(2^n)$ and $2^{2n} = O(2^n)$ are

A. True & True B. True & False C. False & True D. False & False

21. There exists a comparison sort of 5 numbers that uses at most 6 comparisons in the worst case.

A) Yes B) No at least seven are required C) No at least 8 are required D) No at least 9 are required

22. If an in-place sorting algorithm is given a sorted array, it will always output an unchanged array in the same sequence.

A) True, because elements are already sorted B) False, because sorting may not be stable

C) False, because comparisons are used D) False, because Non-Comparison sorts may be used

23.
```
for i = 1 to n-1 do
    min = i
for j = i+1 to n do
    If (a[j] < a[min])
    then min = j
If (i < min) then swap(a[i],a[min])
```

The Given code is for

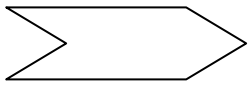
A. Bubble sort B. Insertion sort C. Quick Sort D. Selection Sort E. Radix Sort

24. In a fractional Knapsack three items(1,2,3) have weights (4,8,6) & profits (12,32,30) respectively. If the weight of the knapsack is 10 then the solution is

A) 3→6 , 2→4 B) 3→4 , 2→6 C) 3→6 , 1→4 D) 1→4 , 2→6

25. In the given graph the maximum distance found between two vertices with the help of BFS will be

A) 1 B) 2 C) 3 D) 4



26.
```
for i = 1 to n-1 do
    for j = 1 to n-i do
    if (a[j+1] < a[j]) then swap a[j] and a[j+1]
```

The given code is for

A. Bubble sort B. Insertion sort C. Quick Sort D. Selection Sort E. Radix Sort

27. How much time it will take to find the largest item in a min-heap

A) O(n) B) O(1) C) O(logn) D) O(nlogn)

28. A rotate operation on balanced tree always increases the depth of at least one node and decreases the depth of at least one node.

A) True B) False C) Only increases the depth of one node D) only decreases depth of one node

29. What is the expected difference between the depth of the deepest leaf and the depth of the least deep leaf in a 2-3-4 tree containing N elements?

A) zero B) log n C) n D) 1

30. Heapsort, quicksort, and mergesort are all asymmptotically optimal, stable comparison based sort algos.

A) True B) False C) true only for quicksort & mergesort D) true only for heapsort & quicksort