Register Number: ………………..

B.E / B.TECH DEGREE EXAMINATIONS: JUNE 2015

(Regulation 2009)

Third Semester

CSE104 : DESIGN AND ANALYSIS OF ALGORITHMS

(Common to CSE/IT)

**Time: Three Hours**   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Which of the following functions has the largest growth rate?

    a) $n^{(1/2)}$ b) n^{100}

    c) $2^{(n/2)}$ d) $2^{(n!)}$

2. Two main measures for the efficiency of an algorithm are

    a) Processor and memory   b) Complexity and capacity

    c) Time and space   d) Data and space

3. Which algorithrm las the time complexity on $O(N^3)$

    a) Much more complicated to analyze   b) Much more simpler to analyze than that of
        than that of worst case   worst case
    c) Sometimes more complicated and   d) None or above
        some other times simpler than that of
        worst case

4. The running time of binary search is

    a) O(n)   b) O(log n)

    c) O(nlog n)   d) $O(n^2)$

5. Which of the following is true

    a) Merge sort takes T(n)=2T(n/2)+O(n)   b) Merge sort takes T(n)=3T(n/2)+O(n)

    c) Quick sort takes O(n^2) time in its   d) None of These
        average case
6. In a max Heap tree

    a) Values in a node is greater than every   b) Values in a node is greater than every value in
        value in left sub tree and smaller than   children of it
        right sub tree
    c) Both of above conditions applies   d) None of above conditions applies
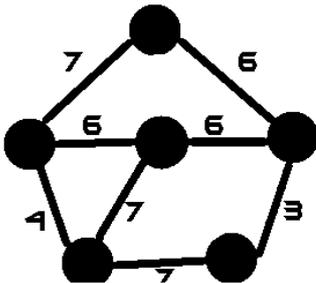
7.
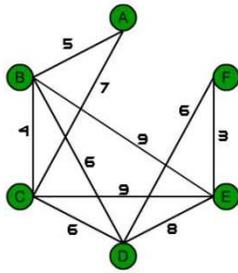
For the above question, what will be the shortest route?

a) A -> B -> D -> E -> F

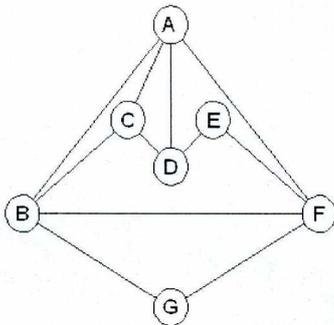b) A -> C -> D -> E -> F

c) A -> C -> E -> F

d) A -> B -> D -> F

8.

Refer to the above graph find the minimum cost spanning tree cost

a) 18

b) 22

c) 20

d) 25

9. Which of the following describes a Hamiltonian circuit for the following graph?

a) AFEDCBG

b) ADEFGBA

c) ABCDEFGBA

d) ABGFEDCA

10. For the travelling salesperson problem (Dijkstras algorithm) applied to four cities, how many distinct Hamiltonian tours are possible?

a) 3

b) 6

c) 12

d) 24

PART B (10 x 2 = 20 Marks)

11. Point out the properties of sorting algorithm

12. Define Ω notation

13. ALGORITHM Mystery(n)

S ←0

for i ←1 to n do

S ←S + i * i

return S

Find out the basic operation and calculate how many times is the basic operation executed?

14. Give the type of algorithm visualization

15. Construct a binary tree of

Inorder sequence: D B E A F C
Preorder sequence: A B D E C F

16. Write insertion sort algorithm

17. Define catalon number

18. Mention the purpose of transitive closure

19. Compare back tracking and branch and bound techniques.

20. Give any one application of Hamiltonian circuit.

PART C (5 x 14 = 70 Marks)

21. a)   Mention three different methods to find out GCD of two numbers.

(OR)

b) (i) Discuss the framework of analyzing the algorithm.   (7)

(ii) Mention any five important problem types and explain.   (7)

22. a)   Design a recursive algorithm for computing 2n for any nonnegative integer n that is based on the formula $2^n = 2^{n-1} + 2^{n-1}$. Set up and solve the recurrence relation for the number of times the algorithm's basic operation is executed

(OR)

b) (i) Write a program to find the occurrence of a particular number in the given array.   (7)
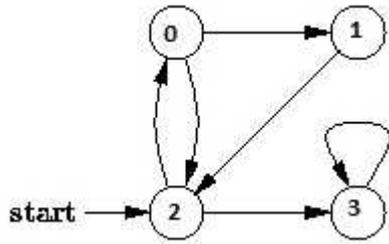Find the summation of the array.

(ii) Elaborate about empirical analysis in detail.   (7)

23. a)   Write the quick sort algorithm and also find out the average case analysis.

(OR)

b) (i) Apply insertion sort to sort the list W,E,L,C,O,M,E in alphabetical order.   (7)

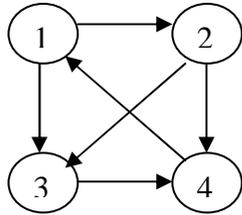(ii) Find the depth first search of the following graph.   (7)

24. a)   Construct Optimal Binary Search Tree using the following data

Key	P	Q	R	S	T
Probability	0.1	0.2	0.4	0.1	0.2

(OR)

b) (i)   Find the transitive closure of the following directed graph using Warshall's Algorithm   (7)

(ii)   Write the floyd's algorithm   (7)

25. a) (i)   Apply backtracking to solve the following instance of the Subset- Sum problem: (7)
S = {1,2,4,5,6} and d=9.

(ii)   Write the back tracking algorithm   (7)

(OR)

b)   Solve the following instance of the Knapsack problem by the Branch- and- Bound algorithm.

Item	Weight	Profit(Rs.)	
1	5	40	
2	7	35	
3	2	18	W = 15
4	4	4	
5	5	10	
6	1	2	

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