Tribhuvan University
Institute of Science and Technology
2081
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Bachelor Level / Third Year/ Fifth Semester/ Science
Computer Science and Information Technology (CSC314)
(Design and Analysis of Algorithms)
(NEW COURSE)

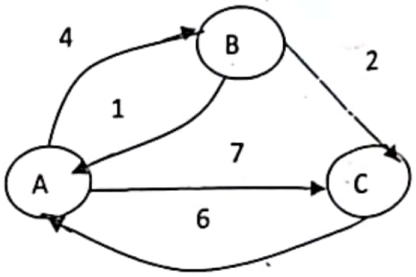
Full Marks: 60
Pass Marks: 24
Time: 3 hours

Candidates are required to give their answers in their own words as for as practicable.
The questions are of equal marks.

Section A

Attempt any TWO questions. **(2×10=20)**

1. Differentiate between dynamic programming and memoization. Compute the shortest path between every pairs in following graphs using Floyd Warshal algorithm. (2+8)



2. What is the worst case of quick sort and how does randomized quick sort handle this problem? Sort the data { -2,4,-3,6,12,10,11,13,9} using quick sort. (3+7)

3. Does greedy algorithm gurantee optimal solution? Solve the Fractional knapsack problem to find maximum loot from given information. (2+8)

Item	1	2	3	4	5	6	7
Value ($)	12	10	20	15	2	3	50
Weight (Kg)	2	1	3	2	12	10	1

knapsack weight (W)= 20 Kg

Section B

Attempt any EIGHT questions **(8×5=40)**

4. Given a set A={5,7,10,12,15,18,20}, find the subset that sum to 35 using backtracking. (5)

5. Solve the following recurrence relations using masters method. (2.5+2.5)

a) $T(n) = 2T(n/2) + n^3$,n>1
=1 , n==1

b) $T(n) = 2T(n/4) + 1$,n>1
=1 , n==1

6. Write the algorithm to find n^{th} fibonacci number with its time and space complexity. (5)

7. Define order statistics problem. Find the edit distance between "cat" and "car" using dynamic programming. (1+4)

8. Discuss about recursion and backtracking. Analyze the complexity of Miller Rabin Randomized Primality test. (1+4)

9. Solve the following linear equations using chinese Remainder Theorem. (5)

$$x = 1\ MOD\ 3$$
$$x = 2\ MOD\ 5$$
$$x = 0\ MOD\ 7$$

10. Explain the approximation algorithm for vertex cover of a connected graph with an example. (5)

11. State cooks theorem. discuss about problem reducibility. (2+3)

12. Write short Notes on (2×2.5=5)
    a) Big Oh, Big Omega, Big theta.
    b) Class P, NP and Np-complete.