



**Sardar Patel Institute of Technology**  
Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058, India  
(Autonomous College Affiliated to University of Mumbai)

Make up Examination

May 2018

Max. Marks: 100

Class: S.Y.

Course Code:MCA43

Name of the Course: Design and Analysis of Algorithms

Duration: 3 Hrs.

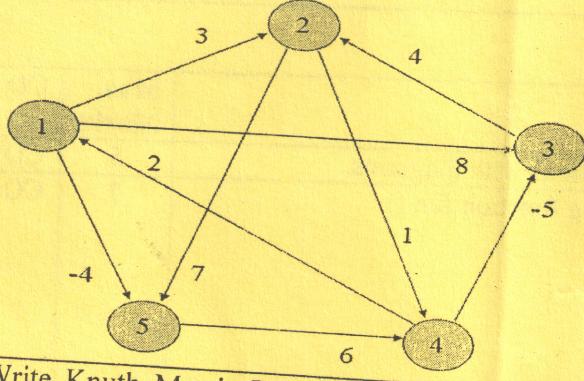
Semester: IV

Branch: M.C.A.

**Instruction:**

- (1) All questions are compulsory
- (2) Draw neat diagrams
- (3) Assume suitable data if necessary

<b>Q. No.</b>		<b>Max. Marks</b>	<b>CO</b>
Q.1a)	Explain the various Asymptotic notations with diagrams.	5	CO1
b)	Find the time complexity of following function fun () function (int n) {     if(n==1) return; for (int i=1; i<=n; i++) { for (int j=1; j<=n; j++) { printf("*"); break; }}}	7	CO1
c)	Draw the recursion tree for the recurrence $T(n) = 2T(n/2) + n^2$ . up to first 3 levels. OR Compare P and NP problems with suitable examples.	8	CO1
Q.2a)	Find the LCS of string 1: AGGTAB    string2: GXTXAYB	6	CO2
b)	Write Kruskal's algorithm for minimum spanning tree. Analyze the algorithm. OR Given a chain of four matrices A1, A2, A3, A4 with p0=5,p1=4,p2=6,p3=2,p4=7. Find m[1,4].	8	CO2
c)	Describe the Dynamic 0/1 Knapsack Problem. Find an optimal solution for the dynamic programming 0/1 knapsack instance for n=4, m=8, profits are (p1, p2, p3, p4) = (15,10,9,5), weights are (w1,w2,w3,w4)=(1,5,3,4).	6	CO2
Q.3a)	Discuss the Graph coloring Problem. What technique is used to solve the problem? Write the algorithm to solve above problem. OR Explain the branch and bound strategy and write an algorithm for basic branch and bound strategy.	7	CO3

b)	Discuss the Hamiltonian Cycles Problem. What technique is used to solve the problem? Write the algorithm to solve above problem.	7	CO3																
c)	Write an algorithm for the sum of subset problem. OR For the following 15-puzzel problem, apply branch and bound technique and generate the state space up to two levels for the given initial state.	6	CO3																
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Q.4a)	Write Dijkstra's algorithm to find the single source shortest path of a given graph.	7	CO4																
b)	find all pair shortest path using Flyod Warshalls algorithm for following graph	6	CO4																
																			
c)	Write Knuth Morris Pratt string matching algorithm. Explain with example. OR Write Rabin Carp string matching algorithm and explain with example.	7	CO4																
Q.5a)	Derive the Best, Worst and Average time complexities of Quick sorting technique. OR Write an algorithm for Vertex cover Problem.	5	CO1																
b)	Discuss Dynamic programming and write an algorithm for Optimal binary search tree.	5	CO2																
c)	Calculate the time complexity for N-Queens problem.	5	CO3																
d)	For following deterministic finite automaton obtain 5 -tuple DFA generate 3 strings which are accepted by this DFA.	5	CO4																
	