Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(An Autonomous Institute Affiliated to University of Mumbai)

End Sem Examination (Make-up)
~~May~~ 2019 – July

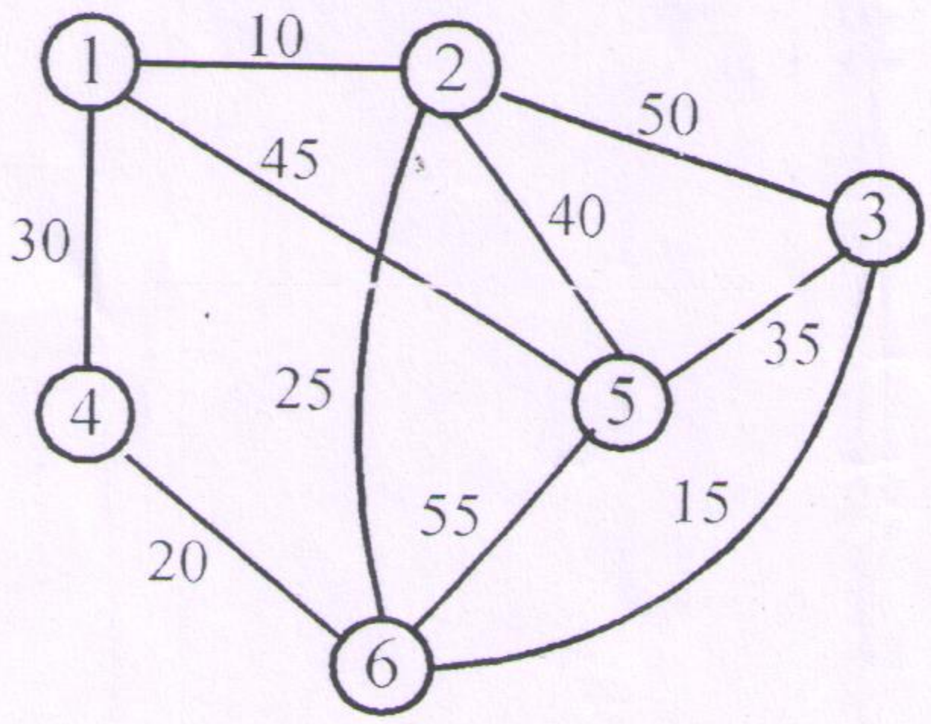
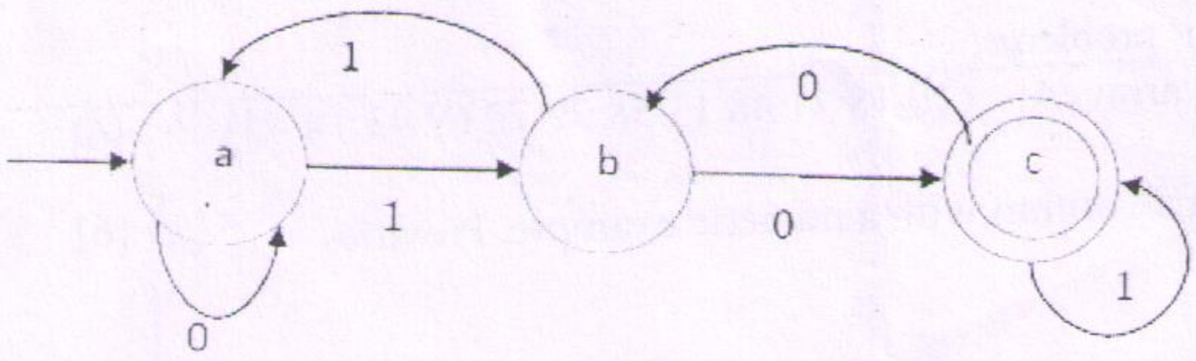
Max. Marks: 60 | **Duration: 3 Hours**
Class: SYMCA | **Semester: IV**
Course Code: MCA43 | **Branch: MCA**
Name of the Course: Design and Analysis of Algorithms

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

QN			Marks	CO's

Q.1	a.	Find the bounding function and complexity of following code.
		1.
		`void function(int n)`
		`{`
		`  int count = 0;`
		`  for (int i=1; i<=n; i++)`
		`  for (int j=1; j<=n; j = j++)`
		`  for (int k=1; k<=n; k = k * 2)`
		`  count++;`
		`}`
		2.
		`void function(int n)`
		`{`
		`  int count = 0;`
		`  for (int i=0; i<n; i++)`
		`  for (int j=i; j< n; j++)`
		`  if (j%i == 0)`
		`  {`
		`  for (int k=0; k<j; k++)`
		`  printf("*");`
		`  }`
		`}`
			[6]	CO-1

	b.	Explain Vertex cover problem give examples in detail **[OR]** Compare and contrast P and NP problems.	[6]	CO-6
Q.2	a.	Apply quick sort algorithm on array A = (10 18 71 48 13 58 79 72 69 93 14 45)	[6]	CO-2
	b.	Explain in detail Binary Search algorithm with a numeric example. Provide complete analysis of the same. **[OR]** Find the multiplication of matrices using Strassen's algorithm. A= 3 5 B= 8 7 6 7 9 5	[6]	CO-2

Q.3	a.	Consider the string1: ABCDMZ, String2: ACABDZ. Find Longest Common Subsequence with its length.	[6]	CO-3
	b.	Given a chain of four matrices, A1, A2, A3, A4 (5, 6,7, 7,8). Find the cost of matrix multiplication.	[6]	CO-3
Q.4	a.	Compare Backtracking and Branch and Bound techniques (Definition, Working, Performance, Analysis, Example) **[OR]** Discuss the 8-Queen Problem. What technique is used to solve the problem? Write the algorithm to solve above problem	[6]	CO-4
	b.	Consider start state for a 15 puzzle problem as shown in table below. Show four levels of branching using branch and bound states with justification <table><tr><td>1</td><td>2</td><td>3</td><td></td></tr><tr><td>4</td><td>5</td><td>6</td><td>8</td></tr><tr><td>7</td><td>9</td><td>10</td><td>12</td></tr><tr><td>11</td><td>13</td><td>15</td><td>14</td></tr></table>	[6]	CO-4
Q.5	a.	Find minimum Spanning Tree for following graph using Kauskal's algorithm. 	[6]	CO-5
	b.	For following deterministic finite automaton obtain 5 –tuple DFA Generate 3 strings which are accepted by this DFA 	[6]	CO-5