

Sardar Patel Institute of Technology

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

Mid Semester Examination

March 2020

Max. Marks: 20

Class: S.E.

Course Code: IT41

Name of the Course: Design and Analysis of Algorithm

Duration: 01 hour

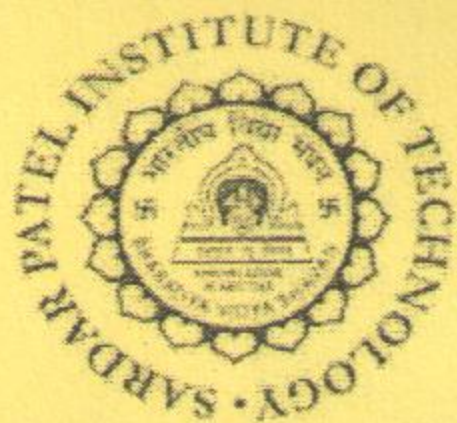
Semester: IV

Branch: IT

Instructions:

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

Q. No.	Questions	Max. Marks	CO-BL-PI
Q1	Analyze the asymptotic time complexity of given fun(). Justify your answer.	02	1-3-2.4.1
a.	<pre>int fun(int n) { int count = 0; for (int i = n; i > 0; i /= 2) for (int j = 0; j < i; j++) count += 1; return count; }</pre>		
b.	Suppose $f(n)$ is $n^2 \log n$. Consider the following statements. (A) $f(n)$ is $O(n \sqrt{n})$ (B) $f(n)$ is $O(n^2 \sqrt{n})$ (C) $f(n)$ is $O(n^3)$ Which of the following is true? Justify your answer 1- (A), (B) and (C) are all not true. 2- (B) and (C) are true but (A) is not true. 3- (B) is true but (A) and (C) are not true. 4- (A) and (B) are true but (C) is not true.	02	
c.	Apply Master's method to solve the given recurrence: $T(n) = 5T(n/4) + n^2$ OR Solve the given recurrence using recursion tree method: $T(n) = T(n/3) + T(2n/3) + \Theta(n)$	02	



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Q2	<p>Suppose we run Dijkstra's single source shortest-path algorithm on the following edge weighted directed graph with vertex A as the source. In what order do the nodes get included into the set of vertices for which the shortest path distances are finalized? Justify your answer. Show the updated data structured at each step .</p> <div></div> <p style="text-align: center;">OR</p> <p>Using Prim's algorithm construct a minimum spanning tree for the given graph. Assume vertex A as source vertex. Show the updated data structured at each step</p> <div></div>	05	3-3-3.1.1								
Q4.	<p>Analyze the performance of Quick sort algorithm . Justify the Worst case, Best case and Average case performance with the help of recurrence equation , recursion tree and example of input test case for all the cases.</p>	05	2-3-2.4.1								
Q5.	<p>Given matrices A and B is as follows . Then find out A*B by Stassen's matrix multiplication.</p> <div><div>A</div><table><tr><td>1</td><td>2</td></tr><tr><td>3</td><td>4</td></tr></table><div>B</div><table><tr><td>5</td><td>6</td></tr><tr><td>7</td><td>8</td></tr></table></div>	1	2	3	4	5	6	7	8	04	2-3-3.1.1
1	2										
3	4										
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7	8										