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PES UNIVERSITY

PES University, Bangalore

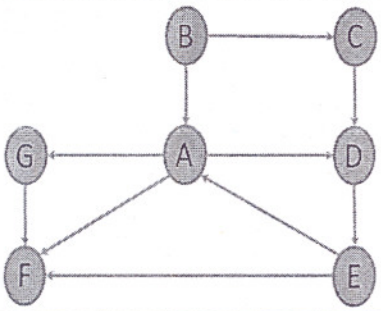
(Established under Karnataka Act No. 16 of 2013)

UC14MC552

MAY 2016: END SEMESTER ASSESSMENT (ESA) MCA IV SEMESTER

UC14MC552- DESIGN AND ANALYSIS OF ALGORITHMS

Time: 3 Hrs | Answer All Questions | Max Marks: 100

1.	a)	Find the order of growth of the following sums 1. $\sum_{i=1}^{n}(i^2+1)^2$ 2. $\sum_{i=1}^{n}(i+1)2^{i-1}$ 3. $\sum_{j=1}^{n}3^{j+1}$ 4. $\sum_{i=3}^{n+1}1$	3 3 3 1
	b)	Write the recursive algorithm for Tower of Hanoi problem and analyze the same.	4+6
2.	a)	Write the quick sort algorithm. Analyze its worst case time efficiency using the recurrence equation.	6+4
	b)	Write an algo for DFS traversal and apply that to the graph shown below starting with vertex 'A'. Write the corresponding DFS forest. 	10
3.	a)	Write the comparison counting sorting algorithm and for the input 30, 20, 56, 75, 31, 19 trace the same.	4+4
	b)	Name the methods to overcome space and time tradeoffs.	2
	c)	Write the algorithm to compute mode using presorting method.	4
	d)	Trace the heapsort for the following values 8,9,2,6,5,1 using Bottom-up approach.	6

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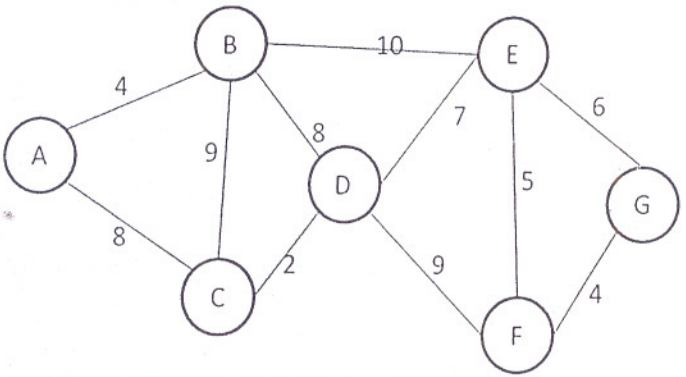
4.	a)	Find the shortest path starting from source **a** and **f** using Dijkstra's algorithm for the following graph.  	5 + 5
	b)	Solve the following Knapsack problem using Dynamic Programming Item | 1 | 2 | 3 | 4 | Weight | 2 | 1 | 3 | 2 | W = 5 Value(Rs.) | 120 | 150 | 200 | 150 |	10
5.	a.	Solve the assignment problem using branch and bound technique $\begin{bmatrix} 4 & 1 & 3 & 2 \\ 4 & 1 & 5 & 1 \\ 2 & 2 & 3 & 2 \\ 8 & 4 & 2 & 3 \end{bmatrix}$	10
	b.	What are decision trees? Write the decision tree for a three element insertion sort.	2+8