K.S. INSTITUTE OF TECHNOLOGY, BANGALORE - 560109

Ist SESSIONAL TEST QUESTION PAPER 2018–19 Even SEMESTER

USN										

Degree : B.E **Semester : IV**
Branch : Computer Science & Engineering **Subject Code : 17CS43**
Subject Title : Design and Analysis of Algorithms **Date : 2019-03-12**
Duration : 90 Minutes **Max Marks : 30**

Note: Answer ONE full question from each part.

Q No.	Question	Marks	K Level	CO mapping
	PART-A			
1(a)	**Write** an algorithm using iteration to output all prime factors of a given positive integer N.	**5**	**Under-standing**	**CO1**
(b)	**Discuss** an algorithm using recursion to output all prime factors of a given positive integer N.	**5**	**Under-standing**	**CO1**
(c)	**Evaluate** the performance of above two algorithms w.r.t. time computation and memory requirements.	**5**	**Applying**	**CO2**
	OR			
2(a)	**Write** an algorithm using recursion to compute Binomial coefficients $^{n}C_{k} = n!/(k!*(n-k)!)$	**5**	**Under-standing**	**CO1**
(b)	**Outline** an algorithm to compute a polynomial using Horner's rule $P_n(x) = a_n x^n + a_{n-1}x^{n-1} + \ldots + a_1 x + a_0$.	**5**	**Under-standing**	**CO1**
(c)	**Construct** the recurrence equation for the computation of Q2(b) and solve the same.	**5**	**Applying**	**CO2**
	PART-B			
3(a)	**Outline** an algorithm to compute sum of N numbers given in an array using divide and conquer technique by dividing the input into two (approximately) equal parts.	**5**	**Under-standing**	**CO1**
(b)	**Show** the recurrence equation for the computation of Q3(a) and solve the same.	**5**	**Under-standing**	**CO1**
(c)	**Apply** the algorithm in Q3(a) to find the sum of following numbers 11, 27, 18, 14, 25, 31, 29, 15. Show the results at each step of the computation.	**5**	**Applying**	**CO2**
	OR			
4(a)	**Compare** the order of growth of following functions: $f(n) = n(n+1)(2n+1)/6$, $g(n) = n^3$	**5**	**Under-standing**	**CO1**
(b)	**Explain** Big-Oh, Big-Theta and Big-Sigma notations and provide one example of each	**5**	**Under-standing**	**CO1**
(c)	**Develop** an algorithm to sort 4 numbers a, b, c, d using max of 5 comparisons.	**5**		**CO2**

Signature of the Faculty **Signature of the Module Coordinator** **Signature of the HOD**

Signature of the Chief Academic Coordinator **Signature of the Principal**