

Reg.No. \_\_\_\_\_



# Karunya UNIVERSITY

(Karunya Institute of Technology & Sciences)  
(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

## End Semester Examination – Nov/Dec – 2016

**Code :** 14CS3017  
**Sub. Name :** Design and Analysis of Algorithms

**Semester :** 2016-17 ODD  
**Duration :** 3hrs  
**Max. marks :** 100

### ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)

Q. No.	Sub Div.	Questions	Course Outcome	Marks
1.	a.	Find the order of growth for solutions of the following recurrences by using backward substitution method or recursion tree method i. $T(n)=2T(n/2)+n-1$ , $T(1)=0$ ii. $T(n)=2T(n/2)+1$ , $T(1)=0$	CO3	12
	b.	Write the recursive algorithm for finding the number of binary digits in the binary representation of a positive decimal integer and analyze the worst case time complexity.	CO3	8
(OR)				
2.	a.	Write short notes on the following notations i. Big-Oh notation ii. Big-Omega notation iii. Big -Theta notation	CO2	12
	b.	Consider the following program A(n) { for (i=1; i<=n; i++) { for (j=1; j<=i; j++) { for (k=1; k<=100; k++) { Printf("Welcome to Karunya University"); } } } } i. What does this program compute? ii. What is the efficiency class of this program?	CO3	8
3.		Write the algorithm for quick sort and analyze the worst case time complexity and best case time complexity.	CO3	20
(OR)				
4.	a.	Write a pseudo code for divide and conquer algorithm for merging two sorted arrays into a single sorted one. Explain with an example.	CO3	15
	b.	Write the algorithm for insertion sort and analyze its worst, best and average case time efficiencies	CO3	5
5.	a.	Construct the heap for the list 1,8,6,5,3,7,4 by bottom up algorithm.	CO3	6

	b.	Give a suitable example and explain the Depth-First Search algorithm.	CO3	14
<b>(OR)</b>				
6.	a.	Outline an algorithm for checking whether an array H[ 1.....n] is a heap and determine its time efficiency.	CO3	6
	b.	Give a suitable example and explain the Breadth-First Search algorithm.	CO3	14
7.	a.	Each of the following lists, construct an AVL tree by inserting their elements successively, starting with the empty tree i. 7, 6, 5, 10, 11, 8, 4, 12, 13, 3 ii. 12, 11, 10, 4, 6, 8, 5, 7, 15, 1	CO3	16
	b.	Define Complete Binary Tree.	CO2	4
<b>(OR)</b>				
8.	a.	Explain briefly about Floyd's algorithm with a suitable example.	CO3	10
	b.	Explain briefly about Warshall's algorithm with a suitable example.	CO3	10
<b><u>Compulsory:</u></b>				
9.	a.	Write short notes on P, NP and NP Complete problems.	CO2	10
	b.	Write Prim's Algorithm for constructing a minimum spanning tree and show the spanning tree construction with a suitable example.	CO3	10

ALL THE BEST

CO1:To provide an introduction to advanced algorithms and its complexities.

CO2:To analyse the efficiency of various algorithms using advanced algorithmic techniques.

CO3:To design efficient algorithms using various design techniques.