NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute)

Affiliated to Dr. A.P. J. Abdul Kalam Technical University, Uttar Pradesh, Lucknow

Course B.TECH Branch Computer Science & Engg.

Semester IV Sessional Examination First Year- (2021 - 2022)

Subject Name: Design & Analysis of Algorithm

Time: 1.15 Hours   [SET- A]   Max. Marks:30

General Instructions:
➤ This Question paper consists of pages 02 & 05 questions. It comprises of three Sections, A, B, and C
➤ Section A -Question No- 1 is objective type questions carrying 1 mark each, Question No- 2 is very short answer type carrying 2 mark each. You are expected to answer them as directed.
➤ Section B - Question No-3 is Short answer type questions carrying 5 marks each. Attempt any two out of three questions given.
➤ Section C - Question No. 4 & 5are Long answer type (within unit choice) questions carrying 6 marks each. Attempt any one part a or b.

		SECTION – A	[08Marks]	
1.		**All questions are compulsory**	(4×1=4)	
	a.	Algorithm can be represented? (a) Pseudo code (b) Syntax (c) Program (d) flow chart	(1)	CO1
	b.	To repeat a task we use:- (a) Input (b)Condition (c) Loop (d) Output	(1)	CO1
	c.	How many passes does an insertion sort algorithm consist of:- (a) N (b) N-1 (c) N+1 (d) N^2	(1)	CO1
	d.	Which of the following case does not exist in complexity theory:- (a) Best case (b) Worst case (c) Average case (d) Null case	(1)	CO1
2.		**All questions are compulsory**	(2×2=4)	
	a.	Write down the characteristics of algorithm.	(2)	CO1

	b.	Write down all the cases of complexity of algorithm.	(2)	CO1
		SECTION – B	**[10Marks]**	
3.		**Answer any <u>two</u> of the following-**	**(2×5=10)**	

	a.	Write the time complexity of Algorithm below
		
		for(i=0; i<n; i++)
		{
		    for(j=0; j<n ;j=2*j)
		    {
		        Statement;
		    }
		}
			(5)	CO1

	b.	Explain asymptotic notations with example.	(5)	CO1
	c.	Solving the following function using recursion tree method: - $T(n)=2T(n/3) + n$ when n>0 $T(n)=1$ when n=0	(5)	CO1
		SECTION – C	**[12Marks]**	
4		**Answer any <u>one</u> of the following-**	**(1×6=6)**	
	a.	Write down the insertion sort algorithm. Analyze time complexity of insertion sort for worst case.	(6)	CO1
	b.	Write down the shell sort algorithm. Solve the following elements using shell sort: - 10, 7, 6, 3, 15, 31, 19	(6)	CO1
5.		**Answer any <u>one</u> of the following-**	**(1×6=6)**	
	a.	Write down the merge sort algorithm. Solve the following elements using merge sort: - 12, 4, 6, 13, 5, 15, 23, 17	(6)	CO1
	b.	Solve the following recurrence relation using iteration or substitution method (Induction method): - $T(n)=T(n-1) + \log n$ for all n>0 $T(n)=1$ when n=0	(6)	CO1