B.Tech. (Sixth Semester, New CBCS) CT-01, Online Examination, 25-January-2022
(Computer Science & Engineering Branch)
Subject-Design and Analysis of Algorithm
Time Allowed:- One hour
Maximum Marks:- 15

Note: There are only short answer type questions and attempt all questions. All questions carry equal marks i.e. 3 marks.

Q1. Solve the following recursion by recursive tree method.

$T(n)=T(\alpha.n)+T(1-\alpha)*n+n$ where $0<\alpha<1$ **[CO-1, BTL-03, Marks-03]**

Q2. Solve the following recursion by recursive tree method. **[CO-1, BTL-03, Marks-03]**

$T(n)=4*T[\lfloor n/2 \rfloor]+n$

Q3. Solve the following recurrence equation by master method. **[CO-1, BTL-03, Marks-03]**

$T(n)=2*T(\sqrt{n})+\lg n$

Q4. Solve the following recurrence equation by backward substitution method.

$T(n)=T(n-1)+O(n)$ **[CO-1, BTL-03, Marks-03]**

Q5. What would be time complexity of following given pseudocode as below.

```
long power(long x, long n)
 {
 for(int i=1;i<=n;i++)
 k=k+3;
 if (n==0) return 1;
 if (n==1) return x;
 if ((n % 2) == 0)
 return (power(x, n/2) * power(x, n/2));
 else
  return (power(x, n/2) * power(x, n/2) * x);
 }
```

[CO-1, BTL-04, Marks-03]