Examination	: B.TECH Semester - V	**Seat No.**	:
Date	: 11/11/2017	**Day**	: Saturday
Time	: 11:00 to 12:15	**Max. Marks**	: 36

INSTRUCTIONS:

1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1   Do as directed.

(a)   What is an Algorithm? How to prove the correctness of an Algorithm?   **[2]**

(b)   Arrange the following the following asymptotic notations in increasing order   **[2]**
$O(\sqrt{n}), O(n^2), O(\log n)\ O(n \log n), O(n!), O(a^n)$

(c)   Solve the recurrence : $T(n) = 2T(n/4) + \sqrt{n}$ **[2]**

(d)   "During Solving the Dijkstra's algorithm, if we consider the edge length as negative also it does not work correctly." – Justify your answer.   **[2]**

(e)   What is the difference between NPC and NPH?   **[2]**

(f)   "Greedy Algorithms may not give optimum solution" state True or False with justification   **[2]**

Q.2   Attempt *Any TWO* of the following questions.   **[12]**

(a)   Find the complexity of the following algorithm
```
        Insert(a, n)
        {   i=n ; item =a[n];
             While( (i>1) and (a[i/2]<item)) do
                  a[i] = a[i/2]; i=(i/2);
              return;
        } NOTE: All " / "(division) operations are integer divisions
```
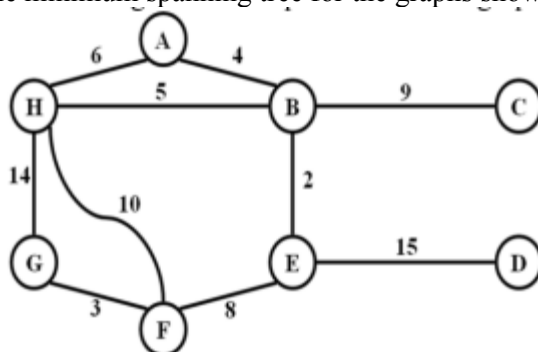
(b)   Give the General template for Divide and Conquer algorithms, also discuss the complexity of such algorithm in general

(c)   Solve following recurrence: $t_n = 0$ if n=0

$$t_n = 5 \ if \ n=1 \quad and \quad t_n = 3t_{n-1} + 4t_{n-2} \ otherwise$$

Q.3   (a)   Find the lower bound on sorting algorithm using comparison tree method   **[6]**

(b)   Find the minimum spanning tree for the graphs shown below using Prim's algorithm   **[6]**

OR

Q.3   (a)   Write down graph coloring algorithm with proper steps   **[6]**

(b)   Find the edit distance between string x="SUNDAY" and y="SATURDAY"   **[6]**