B.TECH SEM - III (2007 COURSE) (INF. TECH.) : WINTER - 2017
SUBJECT: DATA STRUCTURES & FILES

Day: **Friday**　　　　　　　　　　　　　　Time: **10.00 AM TO 01.00 PM**

Date: **19/01/2018**　　　**W-2017-2377**　　　Max. Marks: 80

N.B.:

1) **Q. No. 1** and **Q. No. 5** are **COMPULSORY**. Out of the remaining attempt any **TWO** questions from each section.
2) Figures to the right indicate **FULL** marks.
3) Answers to both the section should be written in **SEPARATE** answer book.
4) Assume suitable data if necessary.

SECTION-I

Q.1 **a)** Define Algorithm. Write down the algorithm to deliver square of given number. **(05)**

b) How to represent Sparse Matrix using Array? **(05)**

c) How does the system deals with unused space? **(04)**

Q.2 **a)** How to calculate Time and space complexity of following code? **(07)**
```
for (int i=0; i≤ 5; i ++)
    {
        i = i* 2-i ;
    }
```

b) How to use concept of pointer to structure? Explain with example. **(06)**

Q.3 **a)** Convert the following expression to prefix and postfix expression **(07)**
$(x-y) (x-y)^3$

b) Explain queue with suitable example. **(06)**

Q.4 **a)** Explain usage of List in student management system application. **(07)**

b) How to remove last node and first node from the List? Explain the process with suitable example. **(06)**

P.T.O.

SECTION- II

Q.5 **a)** How to represent binary tree using an Array? **(05)**

b) How to use Graph as a structure to store the data? **(05)**

c) Explain primary index and clustering index with suitable example. **(04)**

Q.6 **a)** Represent the following data, step by step with the help of AVL tree: **(07)**
INDIA, CHINA, USA, UAE, UK, NEPAL, BHUTAN, SOUTH AFRICA.

b) Convert following tree into binary tree **(06)**
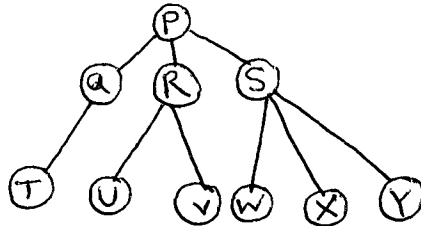
Q.7 **a)** Find minimum cost spanning tree using Prim's Algorithm. **(07)**
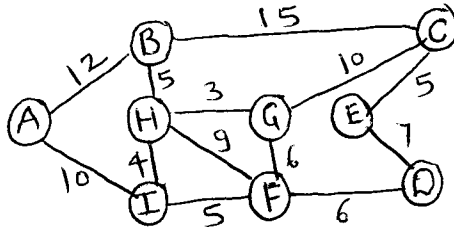
b) Explain features of Kruskal's algorithm with suitable example. **(06)**

Q.8 **a)** Explain the algorithm to perform primitive operations on file. **(07)**

b) Explain sequential file organization with example. **(06)**

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