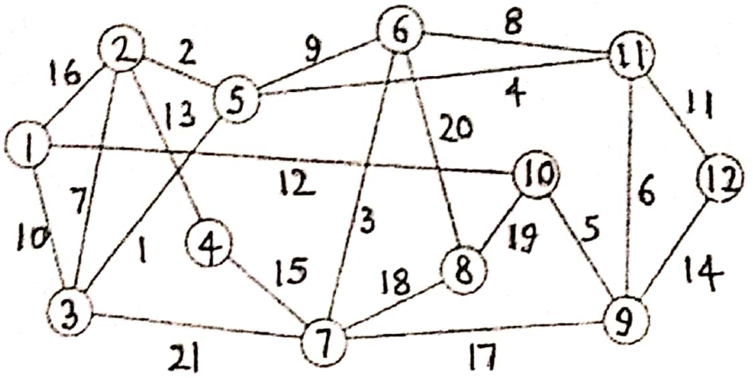
Punjab Engineering College, Chandigarh
Electronics and Communication Engineering
Mid Sem Exam: Jan 2020

Subject: ECE202 **Time: 1.5 hr.**
Total Marks=30

Q1. Consider the graph in figure 1. If we start with node 10 in Vt as the starting node and use Prim's algorithm to construct the minimum spanning tree, give the order in which nodes enter Vt. Also, give the minimum total weight. [6]



Q2. a) You are sorting the following array in ascending order using Insertion Sort.

6,2,7,1,3.

Show the contents of the array after every iteration of the sort (Iteration 0 is the input array). [4]

b) Given the following sequence of letters and asterisks: EAS*Y*QUE***ST***IO*N***

Consider the queue data structure, supporting two operations insert and remove. Suppose that for the above sequence, each letter (such as E) corresponds to an insert of that letter into the queue and each asterisk (*) corresponds to remove operation on the queue. Show the sequence of values returned by the remove operations. [2]

Q3. a) Data are pushed to (PUSH operation) and popped from (POP operation) a stack in the following order: PUSH 3; TOP; PUSH 7; TOP; PUSH 6; PUSH 9; TOP; POP; POP; TOP; where the PUSH, POP and TOP operations of stack behave as discussed in the class. Write the values returned by TOP for the sequence of operations above.

b) Data are enqueued to (ENQ operation) and dequeued from (DEQ operation) a queue in the following order: ENQ 3; FRONT; ENQ 7; FRONT; ENQ 6; ENQ 9; FRONT; DEQ; DEQ; FRONT; where the ENQ, DEQ and FRONT operations of queue behave as discussed in the class. Write the values returned by FRONT for the sequence of operations above. [2*3=6]

Q4. a) Preorder and in order of a tree is give

Preorder ----- A B D H E C F I G J K

Inorder -------- D H B E A I F C J G K. What will be the postorder?

b) What is the difference between Binary trees, Complete Binary tree and Binary Search tree? [2*3=6]

Q5. a) What does given code depict for linked list. [3*2=6]

```
FUN(struct node *head, int value)
{
   struct node *p,*q;
   p=malloc(sizeof(struct node));
   p->data=value;
   p->next=NULL;
   q=head;
   while(q->next!=NULL)
   {
      q = q->next;
   }
   q->next = p;
}
```

b) What does given code depict for linked list.

```
int FUN2()
{
   int r = 0;
   struct node *temp;
            temp = head;
   while(temp != NULL)
   {
      r++;
      temp = temp->next;
   }

   return r;
}
}
```

c) What does given code depict for Binary Tree.

```
int FUN3(struct Node* root)

{
   if (root == NULL || (root->left == NULL &&
                  root->right == NULL))
      return 0;
   return 1 + FUN3(root->left) + FUN3(root->right);
}
```