ST. XAVIER'S SENIOR SECONDARY SCHOOL, DELHI – 110054

Class 12 Time : 1½ hrs.

21-12-2017 Pre-Annual Test in COMPUTER SCIENCE M. Marks : 35

1. Convert the expression (True && False) || !(False || True) to postfix expression. Show the contents of the stack at every step. [2]

2. Use a stack to evaluate the following postfix expression and show the content of the stack after execution of each operation. [2]
AB-CD+E*+ (where A=5, B=3, C=5, D =4, and E=2)

3. Each node of a STACK contains following information, in addition to required pointer field: [4]

i) Roll number of the student
ii) Age of the student
Give the structure of node for the linked stack. TOP is a pointer which points to the topmost node of the STACK. Write the following functions.
i) PUSH() - To push a node to the stack which is allocated dynamically
ii) POP() - To remove a node from the stack and release the memory.

4. Consider the following portion of a program, which implements passengers Queue for a train. Write the definition of function Q_Insert( ), to insert a new node in the queue with required information: [4]

```
struct NODE
{           long TicketNo;
            char PName[20];// Passenger Name
            NODE *NEXT;
};
class TrainQueue
{
            NODE *rear, *front;
public:
            TrainQueue( ) { rear = NULL, front = NULL ;}
            void Q_Insert( );
            void Q_Delete ( );
            ~TrainQueue( );
};
```

5. Given a binary file STUDENT.DAT, containing records of the following class Student type [3]

```
class Student
{
     char S_Admno[IO];    //Admission number of student
     char S_Name[30];       //Name of student
     int Percentage;            //Marks Percentage of student
     public:
          void EnterData()
          {
               gets(S_Admno);
               gets(S_Name);
               cin>>Percentage;
          }
          void DisplayData()
          {
               cout << setw(12) << S_Admno;
               cout << setw(32) << S_Name;
              cout<<setw(3) << Percentage << endl;
          }
          int ReturnPercentage()
          {return Percentage;}
};
```

Write a function in C++, that would read contents of file STUDENT.DAT and display the details of those Students whose Percentage is above 75.

6. Observe the program segment given below carefully and fill the blanks marked as Statement 1 and Statement 2 using seekg() and tellg() functions for performing the required task. [2]

```
#include <fstream.h>
class Employee
{
          int Eno;
          char Ename[20];
          public:
          //Function to count the total number of records
          int Countrec();
};
 int Item::Countrec()
{
          fstream File;
          File.open("EMP.DAT", ios::binary | ios::in);
          __ ___ ____ ___ __ //Statement 1
          int Bytes =___ __ __ _ //Statement 2
          int Count = Bytes / sizeof(Item);
          File.close();
          return Count;
}
```

7. Assuming that a text file named FIRST.TXT contains some text written into it, write a function named copyupper(), that reads the file FIRST.TXT and creates a new file named SECOND.TXT containing all words from the file FIRST.TXT in uppercase. [2]

8. Give the output of the following program:

```
a)    int * SqrNum(int *p)                                              [4]
          {   *p  *= *p ;
             return p;
          }
          int * SqrEle(int *p, int SIZE)
          {   for (int i = 0; i < SIZE; ++i)
               {  *p = *p+10 ;
                  cout<<"\n arr value in fn : "<<*p ;
                   p++;
               }
             return p;
          }
          void main()
          {  int N= 10 ;
           cout <<" N= " << N << endl;
           int *ptr = SqrNum(&N);
           cout << " *ptr = "<< *ptr << endl;
           cout <<" N= " << N << endl;
           int arr[]={10,20,30,40,50};
           int *ptr1 = SqrEle(arr,5);
           ptr1--;
           for (int i = 4; i >=0 ; --i)
           { cout<<"\n arr index "<< i << " : " << *ptr1;
              ptr1--;
           }
          cout<<”\n printing values of arrays as pointer “;
           for (int i = 4; i >=0 ; --i)
           {  cout<<"\n arr index "<< i << ":" << *(arr+i);   }
        }
```

b) void TRANSFER(char *s1 , char *s2) [3]

```
   {
    int n , j=0;
    for(int i=0 ; *(s1+i) != '\0' ; i++)
     {   n = *(s1+i);
        if(n%2==0)
         *(s2 + j++) = *(s1+i);
     }
     }

    void main()
   {
     char *p="ChaRlesBabBaGe"  ,  q[80];
     TRANSFER(p,q);
    cout<<q<<endl;
  }
```

c)#include<iostream.h> [3]

```
#include<ctype.h>
void STRING(char s[ ])
{
for(int i=0,l=0;s[i]!='\0';i++,l++)
{for(int k=0; k<l; j++)
{
if (isupper(s[k]))
s[k]=tolower(s[k])+2;
else if ( islower(s[k]))
s[k]=toupper(s[k])-2;
else
s[k]='@';
}
}
 }
void main()
{
char *c="Romeo Joliet";
STRING(c);
cout<<"Text= "<<c<<endl;
c=c+3;
STRING (c)
cout<<"New Text= "<<c<<endl;
c=c+5-2;
STRING (c)
cout<<"last Text= "<<c
}
```

9. Write a function SORT_MARKS( ) in C++ to sort an array of structure Student in Ascending order of Marks using Bubble sort. [3]

Note: Assume the following definition of structure Student

```
struct Student
{       int RollNo;
        char Name[25];
        float Marks;
};
```

10. An array T [50][20] is stored in the memory along the Column with each element occupying 4 bytes of storage. Find the base address and address of the element T [30][15], if an element T [25][10] is stored at the address 9800. [3]

-x-x-x-x-x-