

Important Questions 2010 Class-XII (Computer Science)

Q.1 Write a function in C++ to insert an element into a dynamically allocated Queue where each node contains a name (of type string) as data.

Assume the following definition of THENODE for the same.

```
struct THENODE
{
char Name[20];
THENODE *Link;
};
```

Solution:

```
struct THENODE
{
char Name[20];
THENODE *Link;
};
class Queue
{
THENODE *front,*rear;
public:
Queue()
{ front = rear = NULL; }
void Insert();
void Delete();
void Display();
};
void Queue::Insert()
{
THENODE *ptr;
ptr=new THENODE;
if(ptr== NULL)
{
cout<<"\nNo memory to create a new node....";
exit(1);
}
cout<<"\nEnter the name....";
gets(ptr->Name);
ptr->Link=NULL;
if(rear== NULL)
front=rear=ptr;
else
{
rear->Link=ptr;
rear=ptr;
}
```

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```
}  
}
```

Q.2. Evaluate the following postfix notation of expression (Show status of stack after execution of each operation). 4, 10, 5, +, *, 15, 3, /, -

Q.3. Write a function in C++ to Delete an element into a dynamically allocated Queue where each node contains a real number as data. Assume the following definition of MYNODE for the same.

```
struct MYNODE  
{  
float NUM;  
MYNODE * Link;  
};
```

Solution:

```
struct MYNODE  
{  
float NUM;  
MYNODE *Link;  
};  
class Queue  
{  
MYNODE *front,*rear;  
public:  
Queue( )  
{ front=rear=NULL; }  
void Insert( );  
void Delete( );  
void Display( );  
};  
void Queue::Delete( )  
{  
MYNODE *temp;  
if(front== NULL)  
cout<<"Queue Underflow";  
else  
{  
cout<<"\nThe content of the element to delete: "<<front->NUM;  
temp=front;  
front=front->Link;  
delete temp;  
}  
}
```

Q.4. Evaluate the following postfix notation of expression (Show status of stack after execution of each operations): 5, 20, 15, -, *, 25, 2, *, + 2.

Ans:

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Children, Try this answer as an assignment.

DELHI : 2007

Q.1. Write a function in C++ to delete a node containing Book's information, from a dynamically allocated Stack of Books implemented with the help of the following structure.

```
struct Book
{ int BNo ;
char BName[20] ;
Book *Next ;
} ;
```

Solution:

```
struct Book
{ int BNo ;
char BName[20] ;
Book *Next ;
} ;
class Stack
{ Book *Top;
public:
Stack( )
{ Top = NULL; }
void Push( );
void Pop( );
void Display( );
};
void Stack::Pop( )
{ Book *Temp;
If( Top== NULL)
cout<<"Stack Underflow...";
else
{ cout<<"\nThe Book number of the element to delete: "<<Top->BNo;
cout<<"\nThe Book name of the element to delete: "<<Top->BName;
Temp=Top;
Top=Top->Next;
Delete Temp;
}
}
```

Q.2. Evaluate the following postfix notation of expression : $25\ 8\ 3\ -\ /\ 6\ * 10 + 2.$

Ans:

Children, Try this answer as an assignment

OUTSIDE DELHI 2007

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Q.1. Write a function in C++ to delete a node containing customer's information, from a dynamically allocated Queue of Customers implemented with the help of the following structure.

```
struct Customer
{ int CNo ;
char CName[20] ;
Customer *Link ;
} ;
```

Solution:

```
struct Customer
{ int CNo ;
char CName[20] ;
Customer *Link ;
} ;
class Queue
{ Customer *front,*rear;
public:
Queue( )
{ front=rear=NULL; }
void Insert( );
void Delete( );
void Display( );
};
void Queue::Delete( )
{ Customer *Temp;
if(front==NULL)
cout<<"Queue Underflow. No element to delete";
else
{ cout<<"\n The customer number for the element to delete"<<front<<CNo;
cout<<"\n The customer name for the element to delete"<<front<<CName;
Temp=front;
front = front->Link;
delete Temp;
}
}
```

Q.2. Evaluate the following postfix notation of expression : $15\ 3\ 2\ +\ /\ 7\ +\ 2.\ * 2$

Ans:

Children, Try this answer as an assignment.

DELHI . 2006

Q.1. class queue
{ int data[10] ;
int front, rear ;
public :
queue() { front = - 1 ; rear = - 1 ; }

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```
void add() ; //to add an element into the queue
void remove() ; //to remove an element from the queue
void Delete(int ITEM() ; //to delete all elements which are equal to ITEM
};
```

Complete the class with all function definitions for a circular array Queue. Use another queue to transfer data temporarily.

Solution:

```
void queue::add()
{ if((front== 0 && rear == 9) || (front==rear+1)
cout<<"\nQueue Overflow";
else if (rear== -1)
{ front=rear=0;
cout<<"\nEnter the element to be inserted";
cin>>data[rear];
}
else if(rear==9)
{ rear=0;
cout<<"\nEnter the element to be inserted";
cin>>data[rear];
}
else
{ rear++;
cout<<"\nEnter the element to be inserted";
cin>>data[rear];
}
}
void queue::remove()
{ if(front== -1)
cout<<"\nQueue Underflow...";
else
{ cout<<"\nThe element to be deleted"<<data[front];
if(front==rear)
front=rear=-1;
else if (front==9)
front=0;
else
front++;
}
}
void queue::Delete(int ITEM )
{
}
```

Q.3. Write a function in C++ to perform a PUSH operation on a dynamically allocated stack containing real number.

struct Node

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```
{ float Number ;  
Node *Link ;  
};  
class STACK  
{ Node *Top ;  
public :  
STACK() {Top = NULL ;}  
void PUSH() ;  
void POP() ;  
~STACK() ;  
};
```

Solution:

```
struct Node  
{ float Number ;  
Node *Link ;  
};  
class STACK  
{ Node *Top ;  
public :  
STACK() {Top = NULL ;}  
void PUSH() ;  
void POP() ;  
~STACK() ;  
};  
void STACK::PUSH()  
{ Node *Temp;  
Temp=new Node;  
if(Temp==NULL)  
{  
cout<<"\nNo memory to create the node...";  
exit(1);  
}  
cout<<"\nEnter the Number to be inserted: ";  
cin>>Temp->Number;  
Temp->Link=Top;  
Top=Temp;  
}
```

Q.4. Write the equivalent infix expression for a, b, AND, a, c, AND, OR.

Ans) a, b, AND, a, c, AND, OR

(a AND b), (a AND c), OR

(a AND b) OR (a AND c)

OUTSIDE DELHI . 2006

Q.1. Introduction class stack

```
{ int data[10] :
```

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```
int top ;
public :
stack( ) { top = - 1; }
void push( ) ; //to push an element into the stack
void pop( ) ; //to pop an element from the stack
void Delete(int ITEM) ; //To delete all elements which are equal to ITEM.
};
```

Complete the class with all function definitions. Use another stack to transfer data temporarily.

Solution:

```
void stack::push( )
{ if(top>=9)
cout<<"Stack Overflow...";
else
{ top++;
cout<<"\nEnter the element to be inserted...";
cin>>data[top];
}
}
void stack::pop( )
{ if(top== -1)
cout<<"\nStack Underflow";
else
{ cout<<"\nThe element to be deleted = "<<data[top];
top--;
}
}
void stack::Delete(int ITEM)
{
}
```

Q.2. Write a function in C++ to perform Insert operation in dynamically allocated Queue containing names of students.

```
struct NODE
{ char Name[20];
NODE *Link;
};
```

Solution:

```
class Queue
{
NODE *front,*rear;
public:
Queue( )
{ front = rear = NULL; }
void Insert( );
void Delete( );
```

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```
void Display( );
};
void Queue::Insert( )
{
NODE *ptr;
ptr=new NODE;
if(ptr== NULL)
{
cout<<"\nNo memory to create a new node....";
exit(1);
}
cout<<"\nEnter the name....";
gets(ptr->Name);
ptr->Link=NULL;
if(rear== NULL)
front=rear=ptr;
else
{
rear->Link=ptr;
rear=ptr;
}
}
```

Q.3. Write the equivalent infix expression for 10, 3, *, 7, 1, -, *, 23, +

Solution:

10, 3, *, 7, 1, -, *, 23, + This is in Postfix form(ie Operator will come after the operand(s)).

Infix form means Operator must come in between the operands.

10, 3, *, 7, 1, -, *, 23, +

Prefix: 10 * 3, 7 - 1, *, 23, +

(10 * 3) * (7 - 1), 23, +

(10 * 3) * (7 - 1) + 23

DELHI : 2005

Q.1. Write a function in C++ to perform a PUSH operation in a dynamically allocated stack considering the following :

```
struct Node
{
int X,Y ;
Node *Link ;
};
class STACK
{
Node *Top ;
public :
STACK( ) {Top = Null ;}
void PUSH( ) ;
```

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```
void POP() ;  
~STACK() ;  
};
```

Solution:

```
struct Node  
{  
int X,Y ;  
Node *Link ;  
};  
class STACK  
{  
Node *Top ;  
public :  
STACK() {Top = NULL ;}  
void PUSH() ;  
void POP() ;  
~STACK() ;  
};  
void STACK::PUSH()  
{  
Node *Temp;  
Temp=new Node;  
if(Temp==NULL)  
{  
cout<<"\nNo memory to create the node...";  
exit(1);  
}  
cout<<"Enter the value of X and Y";  
cin>>Temp->X>>Temp->Y;  
Temp->Link=Top;  
Top=Temp;  
}  
}
```

Q.2. Evaluate the following postfix notation of expression : 10 20 + 25 15 - * 30 /

Ans:

Children, Try this answer as an assignment.

OUTSIDE DELHI : 2005

Q.1. Write a function in C++ to perform a DELETE operation in a dynamically allocated queue considering the following description .

```
struct Node  
{ float U, V ;  
Node *Link ;  
};  
class QUEUE
```

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```
{
Node *Rear, *Front ;
public :
QUEUE() {Rear = NULL ; Front = NULL ;}
void INSERT() ;
void DELETE() ;
~ QUEUE() ;
};
Solution: void Queue::DELETE()
{
NODE *temp;
if(front== NULL)
cout<<"\nQueue Underflow";
else
{
cout<<"\nThe value of U of the element to delete: "<<Front<<U;
cout<<"\nThe value of V of the element to delete: "<<Front<<V;
temp=Front;
Front=Front->Link;
delete temp;
}
}
```

Q.2. Evaluate the following postfix notation of expression : $20\ 10\ +\ 5\ 2\ *\ -\ 10\ /$

Ans:

Children, Try this answer as an assignment.

2004

Q.1. Obtain the postfix notation for the following infix notation of expression showing the contents of the stack and postfix expression formed after each step of conversion : $(P-Q)/(R*(S-T)+U)$

Ans:

$((P-Q)/((R*(S-T))+U))$ S.No Symbol Scanned Stack Expression Y

```
1 ((
2 (((
3 P (( P
4 - (( - P
5 Q (( - P Q
6 ) ( P Q -
7 / (/ P Q -
8 (( (/ ( P Q -
9 (( (/ (( P Q -
10 R (/ (( P Q - R
11 * (/ (( * P Q - R
12 (( (/ (( * ( P Q - R
13 S (/ (( * ( P Q - R S
14 - (/ (( * ( - P Q - R S
```

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```
15 T ( / ( ( * ( - P Q - R S T
16 ) ( / ( ( * P Q - R S T -
17 ) ( / ( P Q - R S T - *
18 + ( / ( + P Q - R S T - *
19 U ( / ( + P Q - R S T - * U
20 ) ( / P Q - R S T - * U +
21 ) P Q - R S T - * U + / Postfix Form: PQ-RST-*U+ /
```

Q.2. Define member functions `queins()` to insert nodes and `quedel()` to delete nodes of the linked list implemented class `queue`, where each node has the following structure.

```
struct node
{ char name[20];
int age;
node *Link;
};
class queue
{ node *rear, *front;
public:
queue() { rear = NULL; front = NULL; };
void queins();
void quedel();
};
```

Solution:

```
void queue::queins()
{ node *ptr;
ptr=new node;
if(ptr== NULL)
{
cout<<"\nNo memory to create a new node....";
exit(1);
} cout<<"\nEnter the name....";
gets(ptr->name);
cout<<"\nEnter the age....";
cin>>ptr->age;
ptr->Link=NULL;
if(rear== NULL)
front=rear=ptr;
else
{
rear->Link=ptr;
rear=ptr;
}
}
void queue::quedel()
{ node *temp;
if(front== NULL)
cout<<"Queue Underflow";
```

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```
else
{ cout<<"\n\nThe name of the element to delete: "<<front->name;
cout<<"\n\nThe age of the element to delete: "<<front->age;
temp=front;
front=front->Link;
delete temp;
}
}
```

DELHI 2003

Q.1. Evaluate the following postfix expression using a stack and show the contents of stack after execution of each operation: 20, 45, +, 20, 10, -, 15, +, *

Ans:

Children, Try this answer as an assignment.

Q.2. Consider the following portion of a program, which implements passengers Queue for a train. Write the definition of function. Insert (whose prototype is shown below); to insert a new node in the queue with required information.

```
struct NODE
{ long Ticketno;
char PName[20]; //Passengers Name
NODE * Next;
};
class Queueoftrain
{ NODE * Rear, * Front;
public :
Queueoftrain() { Rear = NULL; Front = NULL;}
void Insert();
void Delete();
~Queueoftrain();
};
```

Solution:

```
void Queueoftrain::Insert()
{ NODE *ptr;
ptr=new NODE;
if(ptr== NULL)
{
cout<<"\n\nNo memory to create a new node....";
exit(1);
}
cout<<"\n\nEnter the Ticket Number....";
cin>>ptr->Ticketno;
cout<<"\n\nEnter the Passenger Name..";
gets(ptr->PName);
ptr->Next=NULL;
if(rear== NULL)
```

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```
front=rear=ptr;
else
{
rear □ Next=ptr;
rear=ptr;
}
}
```

DELHI . 2002

Q.1. Given the following class,
char *msg[]={"over flow", "under flow"};
class Stack
{ int top; //the stack pointer
int stk[5]; //the elements
void err_rep(int e_num)
{ cout<<msg[e_enum]; //report error message
}
public:
void init()
{ top=0;
} //initialize the stack pointer
void push(int); //put new value in stk
void pop(); //get the top value.
};

Define pop outside the Stack. In your definition take care of under flow condition. Function pop should invoke err_rep to report under flow.

Solution:

```
void Stack::pop( )
{
}
```

Q.2. Change the following infix expression into postfix expression. $(A+B)*C+D/E-F$.

Ans:

Children, Try this answer as an assignment.

DELHI : 2001

Q.1. Write an algorithm to convert an infix expression to postfix expression.

Ans:

The following algorithm transforms the infix expression X into its equivalent postfix expression Y. The algorithm uses a stack to temporarily hold operators and left parentheses. The postfix expression Y will be constructed from left to right using the operands from X and the operators which are removed from STACK. We begin by pushing a left parenthesis onto STACK and adding a right parenthesis at the end of X. The algorithm is completed when STACK is empty.

Algorithm: Suppose X is an arithmetic expression written in infix notation. This algorithm finds the equivalent postfix expression Y.

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1. Push “(“ onto STACK, and add “)” to the end of X.
2. Scan X from left to right and REPEAT Steps 3 to 6 for each element of X UNTIL the STACK is empty.
3. If an operand is encountered, add it to Y.
4. If a left parenthesis is encountered, push it onto STACK.
5. If an operator is encountered, then:
 - (a) Repeatedly pop from STACK and add to Y each operator(on the top of STACK) which has the same precedence as or higher precedence than operator.
 - (b) Add operator to STACK. /* End of If structure */
6. If a right parenthesis is encountered, then:
 - (a) Repeatedly pop from STACK and add to Y each operator (on the top of STACK) until a left Parenthesis is encountered.
 - (b) Remove the left parenthesis. (Do not add the left parenthesis to Y). /* End of If structure */

C++

2009 Outside Delhi:

Q.1.a. What is the difference between Actual Parameter and Formal Parameter? Give an example in C++ to illustrate both types of parameters. 2

Ans:

The parameters in the function call statement (or calling function) are called as Actual Parameters. The parameters in the function definition (or called function) are called as Formal Parameters.

Eg:

```
void manip(int x, int y)
{ ---
---
}
void main()
{
int a,b;
----
Manip(a,b);
}
```

Here a,b are Actual Parameters and x,y are Formal Parameters.

Q.1.b. Write the names of the header files to which the following belong: 1

(i) setw() (ii) sqrt()

Ans:

(i) setw() – iomanip.h (ii) sqrt() - math.h

Q.1.c. Rewrite the following program after removing the syntactical errors (if any).

Underline each correction.

```
include <iostream.h>
include <stdio.h>
class MyStudent
{ int StudentId=1001;
```

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```
char Name[20];
public
MyStudent( )
{
}
void Register( )
{ cin>>StudentId;
  gets(Name);
}
void Display( )
{ cout<<StudentId<<": "<<Name<<endl;
}
};
void main( )
{ MyStudent MS;
  Register.MS( );
  MS.Display( );
}
```

Ans:

```
#include <iostream.h>
#include <stdio.h>
class MyStudent
{ int StudentId;
  char Name[20];
public:
  MyStudent( ) { }
  void Register( )
  { cin>>StudentId;
    gets(Name);
  }
  void Display( )
  { cout<<StudentId<<": "<<Name<<endl;
  }
};
void main( )
{ MyStudent MS;
  MS.Register( );
  MS.Display( );
}
```

Q.1.e. Find the output of the following program:2

```
#include<iostream.h>
#include<ctype.h>
void Secret(char Msg[ ], int N);
void main( )
{ char SMS[ ]="rEPorTmE";
```

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```
Secret(SMS,2);
cout<<SMS<<endl;
}
void Secret(char Msg[ ], int N)
{ for(int C=0;Msg[C]!='\0';C++)
if(C%2==0)
Msg[C]=Msg[C]+N;
else if(isupper(Msg[C]))
Msg[C]=tolower(Msg[C]);
else
Msg[C]=Msg[C]-N;
}
```

Ans: teRmttoe

Q.1.f Study the following program and select the possible output from it:

```
#include<iostream.h>
#include<stdlib.h>
const int MAX=3;
void main( )
{ randomize( );
int Number;
Number=50+random(MAX);
for(int P=Number;P>=50;P--)
cout<<P<<"#";
cout<<endl;
}
(i) 53#52#51#50# (ii) 50#51#52#
(iii) 50#51# (iv) 51#50#
```

Ans:

(iv)51#50#

(Solution: MAX value is 3 That's why random(MAX) can produce 0 or 1 or 2. (random(N) will produce no. between 1 to n-1)

The Number value may be 50 or 51 or 52.

The P value starts from Number, upto 50, each time decreases by 1.

So Possible outputs are as follows:

52#51#50#

51#50#

50#

As the output 51#50# is available in given answers, so 51#50# is the answer.)

2008 Delhi

Q.1.b. Name the header files that shall be needed for the following code: 1

```
void main( )
{ char String[ ] = "Peace";
cout << setw(2)<<String;
```

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```
}
```

Ans:

iomanip.h, iostream.h

Q.1. c. Rewrite the following program after removing the syntactical error(s) if any. Underline each correction.

```
#include<iostream.h>
void main( )
{ First = 10, Second = 20;
  Jumpto(First;Second);
  Jumpto(Second);
}
void Jumpto(int N1, int N2 = 20)
{ N1=N1+N2;
  count<<N1>>N2;
}
```

Ans:

```
#include<iostream.h>
void Jumpto(int N1,int N2=20);
//Prototype missing
void main( )
{ int First = 10, Second = 20;
  //Data type missing
  Jumpto(First,Second);
  //Comma to come instead of ;
  Jumpto(Second);
}
void Jumpto(int N1, int N2)
{ N1=N1+N2;
  cout<<N1<<N2;
  //Output operator << required
}
```

Q.d. Find the output of the following program;3

```
#include<iostream.h>
#include<ctype.h>
void main( )
{ char Text[ ] = "Mind@work!";
  for(int I=0; Text[I]!='\0';I++)
  { if(!isalpha(Text[I]))
    Text[I]='*';
    else if(isupper(Text[I]))
    Text[I]=Text[I]+1;
    else
    Text[I] = Text[I+1];
  }
}
```

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```
cout<<Text;  
}
```

Ans:

Text[] =

When I=0

Since Text[0] is 'M', Upper Case Letter,
(isupper(Text[I]) will becomes true.

So Text[I] =Text[I]+1

So Text[0]=Text[0]+1

Text[0] =77(ASCII Value of M) + 1 = 78

=N(78 is ASCII Value of N)

Now the String Text[] =

When I=1

Since Text[1] is 'i', Which is a character, but
which is not Upper case,
else part will be executed.

Ie Text[I]=Text[I+1]

Here Text[1]=Text[1+1]

=Text[2]

Ie 'n' will be stored in place of 'i'

Now the String Text[] =

When I=2

Since Text[2] is 'n', Which is a character, but which is not Upper case, else part will be executed.

Ie Text[I]=Text[I+1]

Here Text[2]=Text[2+1]

=Text[3]

Ie 'd' will be stored in place of 'n'

Now the String Text[] =

When I=3

Since Text[3] is 'd', Which is a character, but which is not Upper case, else part will be executed.

Ie Text[I]=Text[I+1]

Here Text[3]=Text[3+1]

=Text[4]

Ie '@' will be stored in place of 'd'

Now the String Text[] =

When I=4

Since Text[4] is '@', Since which is not an alphabet,
(!isalpha(Text[I])) will becomes true.

Ie if(!isalpha(Text[I]))

Text[I]='*';

Ie Text[4]='*'

Ie '*' will be stored in place of '@'

Now the String Text[] =

When I=5

Since Text[5] is 'W', Upper Case Letter, (isupper(Text[I]) will becomes true.

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So $\text{Text}[I] = \text{Text}[I] + 1$

So $\text{Text}[5] = \text{Text}[5] + 1$

$\text{Text}[5] = 87$ (ASCII Value of W) + 1 = 88

= X (88 is ASCII Value of X)

Now the String $\text{Text}[\] =$

2

When I=6

Since $\text{Text}[6]$ is 'o', Which is a character, but which is not Upper case, else part will be executed.

I.e $\text{Text}[I] = \text{Text}[I+1]$

Here $\text{Text}[6] = \text{Text}[6+1]$

= $\text{Text}[7]$

I.e 'r' will be stored in place of 'o'

Now the String $\text{Text}[\] =$

When I=7

Since $\text{Text}[7]$ is 'r', Which is a character, but which is not Upper case, else part will be executed.

I.e $\text{Text}[I] = \text{Text}[I+1]$

Here $\text{Text}[7] = \text{Text}[7+1] = \text{Text}[8]$

I.e 'k' will be stored in place of 'r'

Now the String $\text{Text}[\] =$

When I=8

Since $\text{Text}[8]$ is 'k', Which is a character, but which is not Upper case, else part will be executed. I.e $\text{Text}[I] = \text{Text}[I+1]$

Here $\text{Text}[8] = \text{Text}[8+1]$

= $\text{Text}[9]$

I.e '!' will be stored in place of 'k'

Now the String $\text{Text}[\] =$

When I=9

Since $\text{Text}[9]$ is '!', Since which is not an alphabet, ($!\text{isalpha}(\text{Text}[I])$) will becomes true.

I.e $\text{if}(!\text{isalpha}(\text{Text}[I]))$

$\text{Text}[I] = '*'$;

I.e $\text{Text}[9] = '*'$

I.e '*' will be stored in place of '!'

Now the String $\text{Text}[\] =$

Output: Nnd@*Xrk!*

e. Find the output of the following program: 2

```
#include<iostream.h>
void main( )
{ int U=10,V=20;
for(int I=1;I<=2;I++)
{ cout<<"[1]"<<U++<<"&"<<V - 5 <<endl;
cout<<"[2]"<<++V<<"&"<<U + 2 <<endl;
}
}
```

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Ans:

Output:

[1]10&15

[2]21&13

[1]11&16

[2]22&14

f. In the following program, find the correct possible output(s) from the options: 2

```
#include<stdlib.h>
#include<iostream.h>
void main( )
{ randomize( );
char City[][10]= {"DEL","CHN","KOL","BOM","BNG"};
int Fly;
for(int I=0; I<3;I++)
{ Fly=random(2) + 1;
cout<<City[Fly]<<" ";
}
}
```

Outputs:

(i) DEL : CHN : KOL:

(i) CHN: KOL : CHN:

(ii) KOL : BOM : BNG:

(iii) KOL : CHN : KOL:

Ans:

Since random(2) gives either 0 or 1, Fly value will be either 1 or 2. (random(n) gives you any number between 0 to n-1) City[1] is "CHN". City[2] is "KOL". Since I value from 0 to 2 (ie<3), 3 iterations will takes place. So the possible output consists 3 strings separated by :, each of them may be either "CHN" or "KOL".

So the possible output will be

(ii) CHN : KOL : CHN:

(iv) KOL :CHN : KOL:

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Q.1.b. Name the header files that shall be needed for the following code: 1

```
void main( )
{ char word[]="Exam";
cout<<setw(20)<<word;
}
```

Ans:

iostream.h, iomanip.h

Q. 1.c. Rewrite the following program after removing the syntax error(s) if any. Underline each correction. 2

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```
#include<iostream.h>
void main( )
{ One=10,Two=20;
Callme(One;Two);
Callme(Two);
}
void Callme(int Arg1,int Arg2)
{ Arg1=Arg1+Arg2;
Count<<Arg1>>Arg2;
}
```

Ans:

```
void Callme(int Arg1,int Arg2=20);
#include<iostream.h>
void main( )
{ int One=10,Two=20;
Callme(One,Two); //Given ; instead of ,
Callme(Two);
}
void Callme(int Arg1,int Arg2)
{ Arg1=Arg1+Arg2;
cout<<Arg1<<Arg2;
}
```

1.d. Find the output of the following program:3

```
#include<iostream.h>
#include<ctype.h>
void main( )
{ char Mystring[ ] ="what@OUTPUT!";
for(int I=0; Mystring[I]!='\0';I++)
{ if(!isalpha(Mystring[I]))
Mystring[I]='*';
else if(isupper(Mystring[I]))
Mystring[I]=Mystring[I]+1;
else
Mystring[I] =Mystring[I+1];
}
cout<<Mystring;}
```

Ans:

Output:hat@*PVUQVU*

e. Find the output of the following program: 2

```
#include<iostream.h>
void main( )
{ int A=5,B=10;
for(int I=1;I<=2;I++)
```

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```
{ cout<<"Line1"<<A++<<"&"<<B-2 <<endl;
cout<<"Line2"<<++B<<"&"<<A +3 <<endl;
}
}
```

Ans:

Output:

Line15&8
Line211&9
Line16&9
Line212&10

f. In the following program, find the correct possible output(s) from the options: 2

```
#include<stdlib.h>
#include<iostream.h>
void main( )
{ randomize( );
char Area[ ][10]={"NORTH","SOUTH","EAST","WEST"};
int ToGo;
for(int I=0; I<3;I++)
{ ToGo=random(2) + 1;
cout<<Area[ToGo]<<": ";
}
}
```

Ans:

Outputs:

- (i) SOUTH : EAST : SOUTH :
- (ii) NORTH : SOUTH : EAST :
- (iii) SOUTH : EAST : WEST :
- (iv) SOUTH : EAST : EAST :

Ans:

Since random(2) gives either 0 or 1, ToGo value will be either 1 or 2. (random(n) gives you any number between 0 to n-1) Area[1] is "SOUTH". Area[2] is "EAST". Since I value from 0 to 2 (ie<3), 3 iterations will take place. So the possible output consists 3 strings separated by :, each of them may be either "SOUTH" or "EAST".

So the possible output will be

- (i) SOUTH : EAST : SOUTH :
- (iv) SOUTH : EAST : EAST :

2007 Delhi

Q.1.a. Differentiate between a Run Time Error and Syntax Error. Also give suitable examples of each in c++.

Ans:

Run Time Errors: Errors that occur during the execution of a program are called as run time errors. It is

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caused of some illegal operation taking place or inavailability of desired or required conditions for the execution of the program. For instance, if a program is trying to open a file which does not exist or it could not be opened, it results into an execution error. Similarly, if enough memory is not available or an expression is trying to divide a number by zero are run-time errors. Eg: Division by zero. $c=a/b$; User will give the values of a and b at the time of program execution. If he give the value of b as '0', then division by zero, ie a run time error occurs.

Syntax Errors:

Syntax errors occur when rules of a programming languages (syntax) is misused. Ie when a grammatical rule of C++ is violated. Eg (i) $c=a+b$ In this statement, since there is no semicolon at the end of the statement, there will occurs a syntax error.

(ii) $\text{cin}<<a$; In this statement, since stream insertion operator ($<<$) has given instead of stream extraction operation ($>>$), there will occurs a syntax error.

1.b. Name the header file(s) that shall be needed for successful compilation of the following C++ code.

```
1
void main( )
{ char String[20];
gets(String);
streat(String,"CBSE");
puts(String);
}
```

Ans:

stdio.h string.h

Q.1. c. Rewrite the following program after removing the syntactical error(s) if any. Underline each correction.

```
#include<iostream.h>
const int Max 10;
void main()
{ int Numbers[Max];
Numbers = {20,50,10,30,40};
for(Loc=Max-1;Loc>=10;Loc--)
cout>>Numbers[Loc];
}
```

Ans:

```
#include<iostream.h>
const int Max = 10;// Constant Variable
'Max' //must be initialized.Declaration Syntax
Error
void main( )
{ int Numbers[Max]={20,50,10,30,40};
for(Loc=Max-1;Loc>=0;Loc--)
cout>>Numbers[Loc];
}
```

e. Find the output of the following program.

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```
#include<iostream.h>
void Withdef(int HisNum=30)
{
for(int I=20;I<=HisNum;I+=5)
cout<<I<<" ";
cout<<endl;
}
void Control(int &MyNum)
{ MyNum+=10;
Withdef(MyNum);
}
void main()
{ int YourNum=20;
Control(YourNum);
Withdef();
cout<<"Number="<<YourNum<<endl;
}
```

Ans:

Output:

20,25,30,

20,25,30,

Number=30

2005 Delhi

1.a. Differentiate between a Call by Value and Call by Reference, giving suitable examples of each.

Ans:

Call by value. In call by value method, the called function creates a new set of variables and copies the values of arguments into them. The function does not have access to the original variables (actual parameters) and can only work on the copies of values it created. Passing arguments by value is useful when the original values are not to be modified. In call by reference method, a reference to the actual argument (original variable) is passed to the called function. (Reference is an alias for a predefined variable. Ie the same variable value can be accessed by any of the two names: the original variable's name and the reference name.) Thus, in call by reference method, the changes are reflected back to the original values. The call by reference method is useful in situations where the values of the original variables are to be changed using a function.

Program to illustrate the call by valuemethod of function invoking.

```
#include<iostream.h>
#include<conio.h>
int change(int);
void main( )
{ clrscr( );
int orig=10;
cout<<"\nThe original value
is"<<orig<<"\n";
cout<<"\nReturn value of function
```

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```
change()is "<<change(orig)<<"\n";
cout<<"\n\nThe value after function change() is
over"<<orig<<"\n;
getch();
}
int change(int duplicate)
{ duplicate=20;
return duplicate;
}
```

Ans:

Output:

The original value is 10

Return value of function change() is 20

The value after function change() is over 10

Program to illustrate the call by Referencemethod of function invoking:

```
#include<iostream.h>
#include<conio.h>
int change(int&);
void main( )
{ clrscr( );
int orig=10;
cout<<"\n\nThe original value
is"<<orig<<"\n";
cout<<"\n\nReturn value of function
change()is "<<change(orig)<<"\n";
cout<<"\n\nThe value after function change() is
over"<<orig<<"\n;
getch();
}
int change(int &duplicate)
{ duplicate=20;
return duplicate;
}
```

Output:

The original value is 10

Return value of function change() is 20

The value after function change() is over 20

Q. 1. b. Name the header files to which the following belong: (i) abs() (ii) strcmp()

Ans:

(i) abs() - stdlib.h, math.h, complex.h

(ii) strcmp() - string.h

Q.1. c. Rewrite the following program after removing the syntactical error(s), if any. Underline each correction.

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```
#include<iostream.h>
const int Multiple 3;
void main( )
{ value = 15;
for(int Counter = 1;Counter = <5;Counter ++, Value -= 2)
if(Value%Multiple == 0)
cout<<Value * Multiple;
cout<<endl;
else
cout<<Value + Multiple <<endl; }
```

Ans:

```
#include<iostream.h>
const int Multiple=3;
void main( )
{
int Value = 15;
for(int Counter = 1;Counter <=5;Counter ++, Value -= 2)
if(Value%Multiple == 0)
{
cout<<Value * Multiple;
cout<<endl;
}
else
cout<<Value + Multiple <<endl;
}
```

Q.1.e. Find the output of the following program

```
#include<iostream.h>
#include<string.h>
#include<ctype.h>
void Convert(char Str[ ],int Len)
{ for(int Count=0;Count<Len;Count++)
{ if(isupper(Str[Count]))
Str[Count]=tolower(Str[Count]);
else if (islower(Str[Count]))
Str[Count]=toupper(Str[Count]);
else if(isdigit(Str[Count]))
Str[Count]=Str[Count]+1;
else Str[Count]='*';
}
}
void main( )
{ char Text[ ]="CBSE Exam 2005";
int Size = strlen(Text);
Convert(Text,Size);
cout<<Text<<endl;
```

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```
for(int C=0,R=Size - 1;C<=Size/2;C++,R--)
{ char Temp=Text[C];
Text[C]=Text[R];
Text[R]=Temp;
}
cout<<Text<<endl;
}
```

Ans:

Output:

```
cbse*eXAM*3116
6113*MXAe*esbc
```

Q.1. f. Observe the following program SCORE.CPP carefully, if the value of Num entered by the user is 5, choose the correct possible output(s) from the options from (i) to (iv), and justify your option. 2

//Program: SCORE.CPP

```
#include<stdlib.h>
#include<iostream.h>
void main()
{ randomize();
int Num,Rndnum;
cin>>Num;
Rndnum = random(Num) + 5;
for(int N = 1;N<=Rndnum;N++)
cout<<N<<" "; }
```

Output Options:

- (i) 1 2 3 4 (ii) 1 2
- (iii) 1 2 3 4 5 6 7 8 9
- (iv) 1 2 3

Ans:

Expected Output.

(iii) 1 2 3 4 5 6 7 8 9

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Q.1.b. Name the header files to which the following belong. (i) puts() (ii) isalnum()

Ans:

(i) puts() - stdio.h (ii) isalnum() - ctype.h

Q.1.c. Rewrite the following program after removing the syntactical error(s), if any. Underline each correction.

```
#include<iostream.h>
const int divisor 5;
void main()
{ Number = 15;
for(int Count=1;Count<=5;Count++,Number -= 3)
if(Number % divisor == 0)
```

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```
cout<<Number / Dividor;
cout<<endl;
else
cout<<Number + Dividor <<endl;
```

Ans:

```
#include<iostream.h>
const int divisor= 5;
{
int Number = 15;
for(int Count=1;Count<=5;Count++,Number -= 3)
if(Number % divisor == 0)
{ cout<<Number / Dividor;
cout<<endl;
}
else
cout<<Number + Dividor <<endl;
}
```

Q.1.e. Find the output of the following program

```
#include<iostream.h>
#include<string.h>
#include<ctype.h>
void Change(char Msg[],int Len)
{ for(int Count=0;Count<Len;Count++)
{ if(islower(Msg[Count]))
Msg[Count] = toupper(Msg[Count]);
else if(isupper(Msg[Count]))
Msg[Count] = tolower(Msg[Count]);
else if (isdigit(Msg[Count]))
Msg[Count]=Msg[Count]+1;
else Msg[Count] = '*';
}
}
void main( )
{ char Message[ ]="2005 Tests ahead";
int Size=strlen(Message);
Change(Message,Size);
cout<<Message<<endl;
for(int C=0,R=Size - 1; C<=Size/2;C++,R--)
{ char Temp=Message[C];
Message[C]=Message[R];
Message[R]=Temp;
}
cout<<Message<<endl;
}
```

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Ans:

Output.

```
3116*tESTS*AHEAD
DAEHA*SSTEt*6113
```

Q.1.f. Observe the following program GAME.CPP carefully, if the value of Num entered by the user is 14, choose the correct possible output(s) from the options from (i) to (iv), and justify your option.

```
//Program:GAME.CPP
#include<stdlib.h>
#include<iostream.h>
void main( )
{ randomize( );
int Num,Rndnum;
cin>>Num;
Rndnum=random(Num)+7;
for(int N=1;N<=Rndnum;N++)
cout<<N<<" ";
}
```

Output Options.

(i) 1 2 3 (ii) 1 2 3 4 5 6 7 8 9 10 11

(iii) 1 2 3 4 5 (iv) 1 2 3 4

Ans:

Expected Output

(ii) 1 2 3 4 5 6 7 8 9 10 11

2004 Annual Paper.

Q.1.b. Write the names of the header files to (i) gets() (ii) strcmp() (iii)abs() (iv)isalnum()

Ans:

(i)gets() - stdio.h

(ii)strcmp() - string.h

(iii)abs() - math.h, stdlib.h,complex.h

(iv)isalnum() - ctype.h

Q.1.e. What will be the output of the following.

```
#include<iostream.h>
void main( )
{ int var1=5,var2=10;
for(int i=1,i<=2;i++)
{ cout<<var1++<<'\t'<< - - var2<<endl;
cout<<var2- -<<'\t'<<+ + var1<<endl;
}
}
```

Ans:

Output:

5 9

97

77

79

Q1.f. Write definition for a function SumSequence() in C++ with two arguments/ parameters – double X and int n. The function should return a value of type double and it should perform sum of the following series. $1/x - 3!/x^2 + 5!/x^3 - 7!/x^4 + 9!/x^5 - \dots$ upto n terms.

Note: The symbol ! represents Factorial of a number ie $5! = 1 \times 2 \times 3 \times 4 \times 5$.

```
#include<iostream.h>
#include<math.h>
#include<conio.h>
double SumSequence(int x1,int n1);
void main()
{ int x;
int n;
clrscr();
cout<<"Enter the vaue of X and N";
cin>>x>>n;
cout<<"\n\nThe sum of the series =
"<<<SumSequence(x,n);
getch();
}
double SumSequence(int x1,int n1)
{ double sum=0;
int c=0;
for(int i=1;i<=(2*n1);i=i+2)
{ int f=1;
for(int j=1;j<=i;j++)
{ f=f*j;
}
c=c+1;
if(c%2==1)
{ sum=sum+f/(pow(x1,c));
}
else
{ sum=sum-f/(pow(x1,c));
}
}
return sum;
}
```

2003 Annual Paper

Q.1.a. What is the difference between global variables and local variables? Give an example to illustrate the same.

Ans:

The local variables are the variables defined within any function (or block) and are hence accessible

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only within the block in which they are declared. In contrast to local variables, variables declared outside of all the functions in a program are called global variables. These variables are defined outside of any function, so they are accessible to all functions. These functions perform various operations on the data. They are also known as External Variables.

Eg: #include<iostream.h>

```
int a,b;
void main()
{ float f;
---;
---;
}
```

In the above program segment, a and b are global variables, we can access a and b from any function. f is local variable to function main(), we can access f from main() only.

Q.1.b. Name the header file, to which the following built-in function belongs. (i) strcmp() (ii)getc() .

Ans:

(i) strcmp() - string.h

(ii)getc() - stdio.h

Q.1.c. Rewrite the following program after removing all the syntax error(s) if any.

```
#include<iostream.h>
void main( )
{ int P[ ]={90,10,24,15};Q,Number=4;
Q=9;
for[int I=Number-1;I>=0,I--]
switch(I)
{ case 0;
case 3:cout<<P[I]*Q<<endl;break;
case 1:
case 2: cout<<P[I]+Q;
}
}
```

Ans:

```
#include<iostream.h>
void main( )
{ int P[ ]={90,10,24,15},Q,Number=4;
Q=9;
for(int I=Number-1;I>=0;I--)
switch(I)
{ case 0:
case 3:cout<<P[I]*Q<<endl; break;
case 1:
case 2: cout<<P[I]+Q;
}
}
```

Q.1.e. Write the output of the following program.

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```
#include<iostream.h>
int Execute(int M)
{ if(M%3==0)
return M*3;
else
return M+10;
}
void Output(int B=2)
{ for(int T=0;T<B;T++)
cout<<Execute(T)<<"*";
cout<<endl;
}
void main( )
{ Output(4);
Output( );
Output(3);
}
```

f. Write a C++ function SUMFUN() having two parameters Y(of type double) and m(of type integer) with a result type as double to find the sum of the series given below:

$Y + Y^3 / 2! + Y^5 / 3! + \dots + Y^{2m-1} / m!$

```
#include<iostream.h>
#include<math.h>
#include<conio.h>
double SUMFUN(int y1,int m1);
void main()
{ int y;
int m;
clrscr();
cout<<"Enter the vaue of Y and M";
cin>>y>>m;
cout<<"\n\nThe sum of the series =
"<<<SUMFUN(y,m);
getch();
}
double SUMFUN(int y1,int m1)
{ double sum=0;
double upper;
for(int i=1;i<=m1;i++)
{ int f=1;
for(int j=1;j<=i;j++)
{ f=f*j;
}
upper=pow(y1,(i*2-1));
sum=sum+upper/f;
}
return sum;
```

}

2002

Q.1.b. Name the header files of C++ to which the following functions belong. (i)get() (ii)open() (iii)abs() (iv)strcat()

Ans:

(i)get() - iostream.h
(ii)open() - fstream.h
(iii)abs() - math.h, stdlib.h
(iv)strcat() - string.h

Q.1.c. Find the syntax error(s), if any, in the following program.

```
#include<iostream.h>
void main( )
{ int x;
cin>>x;
for( int y=0,y<10,y++)
cout<<x+y;
}
```

Ans:

```
#include<iostream.h>
void main( )
{ int x;
cin>>x;
for( int y=0;y<10;y++)

cout<<x+y;
}
```

Q.1.d. Write the output of the following program.

```
void main( )
{ int x=5,y=5;
cout<<x- -;
cout<<" ";
cout<- - x;
cout<<" ";
cout<<y- -<<" "<<- -y;
}
```

Ans:

Output. 5,3,4,4

Q.1.e. Write the output of the following program.

```
#include<iostream.h>
void X(int &A,int &B)
{ A=A+B;
B=A-B;
```

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```
A=A-B;
}
void main( )
{ int a=4,b=18;
X(a,b);
cout<<a<<" "<<b;
}
```

Ans:

Output:

18,4

Q.1.b. Name the header file to be included for the use of the following built in functions.

(i) getc() (ii) strcat()

Ans:

- (i) getc() - stdio.h
- (ii) strcat() - string.h

Q.1.e. Give the output of the following program.

```
#include<iostream.h>
#include<conio.h>
int g=20;
void func(int &x,int y)
{ x=x-y;
y=x*10;
cout<<x<<" "<<y<<"\n";
}
void main( )
{ int g=7;
func(g,::g);
cout<<g<<" "<<::g<<"\n";
func(::g,g);
cout<<g<<" "<<::g<<"\n";
}
```

Ans:

Output:

-13,-130

-13,20

33,330

-13,33

Q.1.f. Write a function named SUMFIN(), with arguments x, N, which returns the sum of N terms of the following series.

$x - x^3/3 + x^5/5 - x^7/7 + x^9/9$

```
#include<iostream.h>
#include<math.h>
#include<conio.h>
```

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```
double SUMFIN(int x1,int n1);
void main()
{ int x;
int n;
clrscr();
cout<<"Enter the vaue of X and N";
cin>>x>>n;
cout<<"\nThe sum of Series = "<<SUMFIN(x,n);
getch();
}
double SUMFIN(int x1,int n1)
{ double sum=0;
int c=0;
for(int i=1;i<=(2*n1);i=i+2)
{ c=c+1;
if(c%2==1)
{ sum=sum+(pow(x1,i))/i;
}
else
{ sum=sum-(pow(x1,i))/i;
}
}
return sum;
}
```

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Q.1.b. Name the header file, to which following built in function belong. (i) isupper() (ii)setw()
(iii)exp() (iv)strcmp()

Ans:

- (i) isupper() - ctype.h
- (ii)setw() - iomanip.h
- (iii)exp() - math.h
- (iv)strcmp() - string.h

Q.1.c. Will the following program execute successfully?If not, state the reason(s).

```
#include<stdio.h>
void main( )
{ int s1,s2,num;
s1=s2=0;
for(x=0;x<11;x++)
{ cin<<num;
if(num>0)s1+=num;else s2-=num;
}
cout<<s1<<s2;
}
```

Ans:

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The program will not execute successfully. Because some syntax errors are there in the program. They are

(i) cin and cout, stream objects used but iostream.h header file is not included in the

(ii) x is not declared, it should be declared as

(iii) With cin, we should use >> instead of <<.

(iv) The shorthand operator /=, is given wrongly as =/.

So the corrected program is as follows:

```
#include<iostream.h>
void main( )
{ int s1,s2,num;
s1=s2=0;
for(int x=0;x<11;x++)
{ cin>>num;
if(num>0)s1+=num;else s2/=num;
}
cout<<s1<<s2;
}
```

d. Give the output of the following program segment(Assuming all required header files are included in the program):

```
2
char *NAME="a ProFiLe";
for(int x=0;x<strlen(NAME);x++)
if(islower(NAME[x]))
NAME[x]=toupper(NAME[x]);
else if(isupper(NAME[x]))
if(x%2!=0)
NAME[x]=tolower(NAME[x-1]);
else
NAME[x]--;
cout<<NAME<<endl;
```

Ans:

Output: AORooliE

Q.1.e. Write the output of the following program

```
#include<iostream.h>
int func(int &x,int y=10)
{ if(x%y==0) return ++x;else return y- -;
}
void main( )
{ int p=20,q=23;
q=func(p,q);
cout<<p<<q<<endl;
p=func(q);
cout<<p<<q<<endl;
q=func(p);
cout<<p<<q<<endl;
```

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```
}
```

Ans:

Output. 2023

1023

1111

f. Write a function seqsum() in C++ with two arguments, double x and int n. The function should return a value of type double and it should find the sum of the following series.

$1 + x/2! + x^2/4! + x^3/6! + x^4/8! + x^5/10! + \dots + x^n/(2n)!$

```
#include<iostream.h>
```

```
#include<math.h>
```

```
#include<conio.h>
```

```
double seqsum(int x1,int m1);
```

```
void main()
```

```
{ int x;
```

```
int m;
```

```
clrscr();
```

```
cout<<"Enter the vaue of X and M";
```

```
cin>>x>>m;
```

```
cout<<"\n\nThe sum of the series =
```

```
"<<seqsum(x,m);
```

```
getch();
```

```
}
```

```
double seqsum(int x1,int m1)
```

```
{ double sum=1;
```

```
for(int i=1;i<=m1;i++)
```

```
{ int f=1;
```

```
for(int j=1;j<=2*i;j++)
```

```
{ f=f*j;
```

```
}
```

```
sum=sum+pow(x1,i)/f;
```

```
}
```

```
return sum;
```

```
}
```

1999 Annual Paper

Q.1.a. Why main() function is so special. Give two reasons?

Ans:

Execution of the program starts and ends at main(). The main() is the driver function of the program. If it is not present in a program, no execution can take place.

Q.1.e. Write the output of the following program

```
#include<iostream.h>
```

```
int func(int &x,int y=10)
```

```
{ if(x%y==0) return ++x;else return y- -;
```

```
}
```

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```
void main( )
{ int p=20,q=23;
q=func(p,q);
cout<<p<<q<<endl;
p=func(q);
cout<<p<<q<<endl;
q=func(p);
cout<<p<<q<<endl;
}
```

Ans:

Output. **2023**

1023

1111

f. Write a function seqsum() in C++ with two arguments, double x and int n. The function should return a value of type double and it should find the sum of the following series.

$1 + x/2! + x^2/4! + x^3/6! + x^4/8! + x^5/10! + \dots + x^n/(2n)!$

```
#include<iostream.h>
#include<math.h>
#include<conio.h>
double seqsum(int x1,int m1);
void main()
{ int x;
int m;
clrscr();
cout<<"Enter the vaue of X and M";
cin>>x>>m;
cout<<"\nThe sum of the series =
"<<seqsum(x,m);
getch();
}
double seqsum(int x1,int m1)
{ double sum=1;
for(int i=1;i<=m1;i++)
{ int f=1;
for(int j=1;j<=2*i;j++)
{ f=f*j;
}
sum=sum+pow(x1,i)/f;
}
return sum;
}
```

1999 Annual Paper

Q.1.a. Why main() function is so special. Give two reasons?

Ans:

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Execution of the program starts and ends at main(). The main() is the driver function of the program. If it is not present in a program, no execution can take place.

Q.1.b. Name the header file of C++ to which following functions belong. (i)streat() (ii) scanf() (iii) getchar() (iv)clrscr()

Ans:

- (i)streat() - string.h
- (ii)scanf() - stdio.h
- (iii)getchar() - stdio.h
- (iv)clrscr() - conio.h

Q.1.c. Find the syntax error(s), if any, in the following program:

```
#include<iostream.h>
main( )
{ int x[5],*y,z[5];
for(i=0;i<5;i++)
{ x[i]=i;
z[i]=i+3;
y=z;
x=y;
}
}
```

Ans:

(i) Line No 5: Undefined symbol 'i'. The variable 'i' is not declared in the program. (ii)Line No 0:Assign the value of a pointer to an integer variable. Ie error in x=y.

Q.1.e. Write the output of the following program.

```
#include<iostream.h>
static int i=100;
void abc( )
{ static int i=8;
cout<<"first ="<<I;
}
main( )
{ static int i=2;
abc( );
cout<<"second ="<<i<<endl;
}
```

Ans:

Output: First =8second =2

1.f. Write a C++ function that converts a 2- digit octal number into binary number and prints the binary equivalent.

```
#include<iostream.h>
#include<conio.h>
void binary(int a)
```

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```
//member function for conversion
{ int i,b[5]; //integer array 6
for(i=3;i>=1;i--)
{ b[i]=a%2;
a=a/2;
}
for(i=1;i<=3;i++)
cout<<b[i];
}
void main()
{ int n,x,y;
clrscr( );
cout<<"Enter a two digit octal number: ";
cin>>n;
x=n/10;
y=n%10;
binary(x);
binary(y);
getch( );
}
```

1998 Annual Paper.

1.b. Name the header files, to which the following built in functions belongs to. (i)cos()
(ii)setw((iii)toupper() (iv)strcpy()

Ans:

- (i) cos() - math.h
- (ii) setw() - iomanip.h
- (iii) toupper() - ctype.h
- (iv) strcpy() - string.h

Q.1.c. Find the syntax error(s), if any, in the following program.

```
include<iostream.h>
void main( )
{ int R; W=90;
while W>60
{ R=W-50;
switch(W)
{ 20:cout<<"Lower Range"<<endl;
30:cout<<"Middle Range "<<endl;
40:cout<<"Higher Range"<<endl;
} }
}
```

Ans:

- (i) Line 1: It should be,
#include<iostream.h>
- (ii) Line 4: Variables should be

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separated using commas.

It should be `int R,W=90;`

(iii) Line 5: Test expression should be in braces. It should be `while`

`(W>60)`

(iv) Line 10: It should be `case 20;`

(v) Line 11: It should be `case 30;`

(vi) Line 13: It should be `case 40;`

So the corrected version of the program is as follows.

```
#include<iostream.h>
void main( )
{ int R, W=90;
while (W>60)
{R=W-50;
switch(W)
{ case 20:cout<<"Lower Range"<<endl;
case 30:cout<<"Middle Range "<<endl;
case 40:cout<<"Higher Range"<<endl;
} }
}
```

1.d. Give the output of the following program.

```
segment: char *NAME="IntRAnE";
for(int x=0;x<strlen(NAME); x++)
if(islower(NAME[x])
NAME[x]=toupper(NAME[x]));
else if(isupper(NAME[x]))
if(x%2==0)
NAME[x]=tolower(NAME[x]);
else
NAME[x]=NAME[x-1];
puts(NAME);
```

Ans:

Output: **INTTaNEE**

Q.1.f. Write the output of the following program.

```
#include<iostream.h>
void Execute(int &X,int Y=200)
{ int TEMP=X+Y;
X+=TEMP;
if(Y!=200)
cout<<TEMP<<X<<Y<<endl;
}
void main( )
{ int A=50,B=20;
Execute(B);
cout<<A<<B<<endl;
```

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```
Execute(A,B);  
cout<<A<<B<<endl;  
}
```

1.f. Write a C++ function having two value parameters X and N with result type float to find the sum of series given below.

$1 + x1/2! + x2/3! + x3/4! + x4/5! + \dots - xn/(n+1)!$

```
#include<iostream.h>  
#include<conio.h>  
#include<math.h>  
float sum_series(float X,int N) //function  
being declared  
{ float sum=0,term;  
int fact,f;  
sum+=1;  
for(int i=1;i<=N;i++)  
{ fact=1;  
for(f=1;f<=(i+1);f++)  
fact*=f;  
term=pow(X,i)/fact;  
sum+=term;  
}  
return(sum);  
}  
void main( )  
{ clrscr( );  
float x1;  
int n1;  
cout<<"\nEnter the value of X and N";  
cin>>x1>>n1;  
cout<<"\nThe Sum of the Series  
..."<<sum_series(x1,n1);  
getch(); }
```

Q1. .a. What is the difference between Global Variable and Local Variable?

Ans:

Global Variable Local Variable

- It is a variable, which is declared outside all the functions
- It is accessible throughout the program
- It is a variable, which is declared with in a function or with in a compound statement
- It is accessible only within a function/compound statement in which it is declared

```
#include <iostream.h>  
float NUM=900; //NUM is a global variable  
void LOCAL(int T)  
{ int Total=0; //Total is a local variable  
for (int I=0;I<T;I++)
```

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```
Total+=I;  
cout<<NUM+Total;  
}  
void main()  
{ LOCAL(45);  
}
```

1.b) Write the names of the header files to which the following belong.

(i) strcmp() (ii) fabs()

Ans:

(i) string.h (ii) math.h