

Sample Paper – 2014
Class – XII
Subject – COMPUTER SCIENCE (C++)

Time allowed: 3 hours

Maximum Marks: 70

General Instruction

1. All questions are compulsory.
2. Programming language : C++

Question 1

- (a) Differentiate between typedef and #define. Give example to illustrate both. 2
- (b) Name the header file(s) that shall be needed for successful compilation of the following C++ code. 1
- ```
void main()
{
int a=10;
iota(a)
cout<<setprecision(4)<<a;
}
```
- (c) Rewrite the following program after removing the syntactical error(s) if any. Underline each correction. 2
- ```
#include<iostream.h>
void main()
{
First=10, Second=20;
Jumpto(First;Second);
Jumpto(second);
}

void Jumpto(int N1, int N2=20)
{
N1=N1+N2;
cout<<N1>>N2;
}
```
- (d) Find the output of the following program: 3
- ```
#include<iostream.h>
void main()
{int Track[]={ 10,20,30,40 },*Striker;
Striker=Track;
Track[1]+=30;
cout<<"Striker"<<*Striker<<endl;
*Striker-=10;
Striker++;}
```

```
cout<<"Next @"<<*Striker<<endl;
Striker+=2;
cout<<"Last #"<<*Striker<<endl;
cout<<"Reset To" << Track[0]<<endl;
}
```

(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="JAgoIndiAJAgo";
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;
}
```

(f) Observe the following program RANDNUM.CPP carefully. If the value of VAL entered by the user is 10, choose the correct possible output(s) from the options from i) to iv) and justify your option.

2

```
#include<iostream.h>
#include<stdlib.h>
#include<time.h>
void main()
{
randomize();
int VAL, Rnd; int n=random(2);
cin>>VAL;
Rnd=8 + random(sizeof(VAL)) * 1;
while(n<=Rnd)
{
cout<<n<<"\t";
n++;
}
}
```

**Output options:**

- i) 1 2 3 4 5 6 7 8 9 10 11 12 13

- ii) 0 1 2 3 4 5 6 7 8
- iii) 1 2 3 4 5
- iv) 1 2 3 4 5 6 7 8

**Question 2. Answer the following questions.**

- (a) What do you mean by static data members of a class? Explain the characteristics of static data members? 2
- (b) Answer the questions (i) and (ii) after going through the following program: 2

```
class Science
{
char Topic[20];
int Weightage;
public:
Science () //Function 1
{
strep (Topic, "Optics");
Weightage = 30;
cout<<"Topic Activated";
}
~Science() //Function 2
{
cout<<"Topic Deactivated";
}
Science(Science &S) //Function 3
{
};
};
```

- (i) Name the specific features of class shown by Function 1 and Function 2 in the above example. How would Function 1 and Function 2 get executed ?
- (ii) Name the specific feature of Class shown by Function 3? Complete the definition of this?
- (c) Define a class PhoneBill in C++ with the following descriptions. 4

**Private members:**

|              |                                                                                        |
|--------------|----------------------------------------------------------------------------------------|
| CustomerName | of type character array                                                                |
| PhoneNumber  | of type long                                                                           |
| No_of_units  | of type int                                                                            |
| Rent         | of type int                                                                            |
| Amount       | of type float.                                                                         |
| calculate( ) | This member function should calculate the value of amount as Rent+ cost for the units. |

Where cost for the units can be calculated according to the following conditions.

|                |             |
|----------------|-------------|
| No_of_units    | Cost        |
| First 50 calls | Free        |
| Next 100 calls | 0.80 @ unit |
| Next 200 calls | 1.00 @ unit |

Remaining calls 1.20 @ unit

**Public members:**

- \* A constructor to assign initial values of CustomerName as “Raju”, PhoneNumber as 259461, No\_of\_units as 50, Rent as 100, Amount as 100.
- \* A function accept() which allows user to enter CustomerName, PhoneNumber, No\_of\_units And Rent and should call function calculate( ).
- \* A function Display( ) to display the values of all the data members on the screen.

d) Answer the questions (i) to (iv) based on the following code :

4

```
class DRUG
{
 char catg[10];
 char DOF[10], comp[20];
public:
 DRUG();
 void endrug();
 void showdrug();
};

class TABLET : public DRUG
{
protected:
 char tname[30], volabel[20];
public:
 TABLET();
 void entab();
 void showtab();
};

class PAINKILLER : public TABLET
{
 int dose, usedays;
 char seffect[20];
public :
 void entpain();
 void showpain();
};
```

- i) How many bytes will be required by an object of TABLET?
- ii) Write names of all the member functions of class PAINKILLER.
- iii) Write names off all members accessible from object of class PAINKILLER.
- iv) Write names of all data members accessible from functions of class PAINKILLER.

**Question 3**

- (a) An array Arr[35][15] is stored in the memory along the row with each of its element occupying 4 bytes. Find out the base address and the address of an element Arr[20][5], if the location Arr[2][2] is stored at the address 3000. 3
- (b) Define a function SWAPCOL( ) in C++ to swap (interchange) the first column elements with the last column elements , for a two dimensional integer array passed as the argument of the function.

Example: if the two dimensional array contains

3

|   |   |   |   |
|---|---|---|---|
| 2 | 1 | 4 | 9 |
| 1 | 3 | 7 | 7 |
| 5 | 8 | 6 | 3 |
| 7 | 2 | 1 | 2 |

After swapping of the content of 1<sup>st</sup> Column and last column, it should be:

|   |   |   |   |
|---|---|---|---|
| 9 | 1 | 4 | 2 |
| 7 | 3 | 7 | 1 |
| 3 | 8 | 6 | 5 |
| 2 | 2 | 1 | 7 |

- (c) Write a function SORTSCORE() in C++ to sort an array of structure Examinee in descending order of Score using Bubble Sort. 3

Note: Assume the following definition of structure Examinee

```
struct Examinee
{
long Rollno;
char Name[20];
float Score;
};
```

**Sample Content of the array (before sorting)**

| Rollno | Name        | Score |
|--------|-------------|-------|
| 1001   | Ravinder    | 300   |
| 1005   | Faijal Khan | 289   |
| 1002   | Ankita      | 345   |
| 1003   | Gorge Baily | 297   |

**Sample content of the array (after sorting)**

| Rollno | Name        | Score |
|--------|-------------|-------|
| 1002   | Ankita      | 345   |
| 1001   | Ravinder    | 300   |
| 1003   | Gorge Baily | 297   |
| 1005   | Faijal Khan | 289   |

- (d) Write a function in C++ to delete a node containing city's information (ie city name and its population) from a dynamically allocated Queue of cities. 3
- (e) Evaluate the following postfix notation of expression (show the position of stack) 2  
6, 10, 5, +, \*, 18, 3, /, -

**Question 4.**

- (a) Observe the program segment given below carefully, and answer the question that follows: 1

```
class Member
{
int Member_no ;
```

```

 char Member_name[20] ;
public :
 void enterdetails () ; //function to enter Member details
 void showdetails () ; //function to display Member details
 int RMember_no() //function to return Member_no
 {return Member_no ;}
};
void Update (Member NEW)
{ fstream File ;
 File.open("MEMBER.DAT" , ios :: binary | ios :: in | ios :: out) ;
 Member OM ;
 int Recordsread = 0, Found = 0 ;
 while (!Found && File.read((char*) & OM, sizeof(OM)))
 {
 Recordsread++ ;
 if (NEW.RMember_no() == OM.RMember_no())
 { _____ // Statement 1
 _____ // Statement 2
 Found = 1;
 }
 else
 File.write((char*) & OM, sizeof(OM)) ;
 }
 if (!Found)
 cout<<"Record for modification does not exist";
 File.close() ;
}

```

If the function Update( ) is supposed to modify a record in file MEMBER.DAT with the values of Member NEW passed to its argument, write the appropriate statements for statement 1 using seekp( ) or seekg( ) whichever needed, statement 2 using read( ) or write( ) method, whichever needed in the above code that would write the modified record at its proper place.

- (b) Assuming that a text file named FIRST.TXT contains some text written into it, write a function named vowelwords( ), that reads the file FIRST.TXT and creates a new file named SECOND.TXT, to contain only those words from the file FIRST.TXT which start with start with a lowercase vowel (i.e. with 'a', 'e', 'i', 'o', 'u'). 2

For example if the file FIRST.TXT contains

**Carry umbrella and overcoat when it rains**

Then the file SECOND.TXT shall contain:

**umbrella and overcoat it**

- (c) Assuming the class VINTAGE as declared below, write a function in C++ to read the objects of VINTAGE from binary file VINTAGE.DAT and display those VINTAGE items, which are priced between 20000 and 25000. 3

```

class VINTAGE
{
int VNO;
char VDesc[10];
float Price;
public:
void GET()
{
cin>>VNO;
gets(VDesc);
cin>>Price;
}
void VIEW()
{
cout<<VNO<<endl;
cout<<VDesc<<endl;
cout<<Price<<endl;
}
float RetrunPrice()
{
return Price;
}
};

```

**Question 5**

- (a) What is a relation? Differentiate between primary key & candidate key? 2
- (b) Consider the following tables ACTIVITY and COACH and Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to (viii). 6

**Table : ACTIVITY**

| ACode | Activity Name | Stadium     | ParticipantsNum | PrizeMoney | ScheduleDate |
|-------|---------------|-------------|-----------------|------------|--------------|
| 1001  | Relay 100 X 4 | Star Annex  | 16              | 10000      | 23-Jan-2004  |
| 1002  | High Jump     | Star Annex  | 10              | 12000      | 12-Dec-2003  |
| 1003  | Shot Put      | Super Power | 12              | 8000       | 14-Feb-2004  |
| 1005  | Long Jump     | Star Annex  | 12              | 9000       | 01-Jan-2004  |
| 1008  | Discuss Throw | Super Power | 10              | 15000      | 19-Mar-2004  |

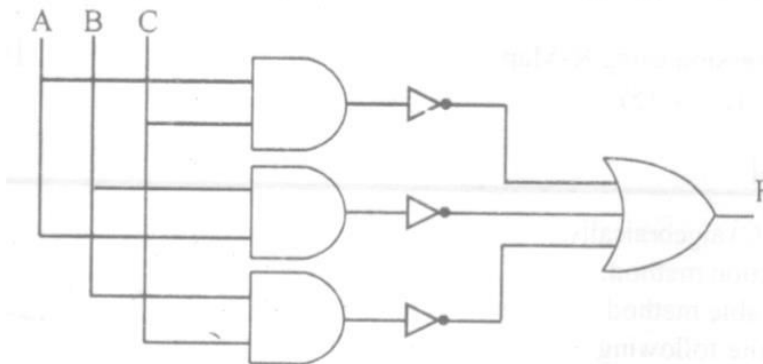
**Table: COACH**

| PCode | Name          | ACode |
|-------|---------------|-------|
| 1     | Ahmad Hussain | 1001  |
| 2     | Ravinder      | 1008  |
| 3     | Janila        | 1001  |
| 4     | Naaz          | 1003  |

- (i) To display the names of all activities with their ACodes in descending order.
- (ii) To display sum of PrizeMoney for the Activities played in each of the Stadium separately
- (iii) To display the coach's name and ACodes in ascending order of ACode from the table COACH.
- (iv) To display the content of the activity table whose schedule date is earlier that 01/01/2004 in ascending order of ParticipantsNum.
- (v) SELECT COUNT(DISTINCT ParticipantsNum) FROM ACTIVITY;
- (vi) SELECT MAX(ScheduleDate), MIN(ScheduleDate) FROM ACTIVITY;
- (vii) SELECT Name, ActivityName FROM ACTIVITY A, COACH C WHERE A.ACode=C.ACode AND A.ParticipantsNum=10;
- (viii) SELECT DISTINCT ACode FROM COACH;

**Question 6**

- (a) State and verify Demorgan's Laws algebraically. 2
- (b) Write the equivalent Boolean Expression for the following Logic Circuit: 2



- (c) Write the POS form of a Boolean function F, which is represented in a truth table as follows: 1

| U | V | W | F |
|---|---|---|---|
| 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

- (d) Reduce the following Boolean Expression using K-Map: 3  
 $F(U,V,W,Z) = \Pi (0,1,2,4,5,6,8,10)$

**Question.7**

- (a) What do you understand by InterSpace? 1
- (b) Write any one example of Client Side Script and Server Side Script. 1



- (c) What is the Difference between Freeware and Shareware? 1  
 (d) Define and explain Cyber Law. 1  
 (e) What is W3C? 1  
 (f) The Ever Mind organization has set up its new branch at Patiala for its office and web based activities. It has 4 wings of buildings which are as follows:

**Center to center distances between various blocks**

|                  |       |
|------------------|-------|
| Wing X to Wing Z | 40 m  |
| Wing Y to Wing Z | 60 m  |
| Wing X to Wing Y | 135 m |
| Wing Y to Wing U | 70 m  |
| Wing X to Wing U | 165 m |
| Wing U to Wing Z | 80 m  |

**Number of computers**

|        |     |
|--------|-----|
| Wing X | 50  |
| Wing Y | 130 |
| Wing U | 40  |
| Wing Z | 15  |

- i) Suggest a most suitable cable layout of connection among the wings and topology. 1  
 ii) Suggest the most suitable place to house the server of this organization with a suitable reason with justification. 1  
 iii) Suggest the placement of the following devices with justification: 1  
 a) Switch/Hub b) Repeater  
 iv) The organization is planning to link its head office situated in Delhi with the offices as Patiala. Suggest a way to connect it; the cost is not the factor. 1  
 (g) What is the difference between the Web Browser and Web Server? Give suitable example? 1

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