

**BHARATIYA VIDYA BHAVAN'S V.M.PUBLIC SCHOOL, VADODARA**  
**SAMPLE PAPER**

**Class : XII**  
**Subject : Computer Science**

**Max Marks : 70**  
**Time Allotted : 3 hrs**

---

**General Instructions :**  
**Programming Language : C++.**  
**All questions are compulsory**

(a) Find the correct identifiers out of the following, which can be used for naming variable, constants or functions in a C++ program : 2  
**While, for, Float, new, 2ndName, A%B, Amount2, \_Counter**

(b) Observe the following program very carefully and write the names of those header file(s), which are essentially needed to compile and execute the following program successfully : 1

```
typedef char TEXT[80];
void main()
{ TEXT q[] = "Work is Worship"; int I=0;
  while (q[I]!='\0')
    if (isupper(q[I]))
      q[I++]='@';
    else
      q[I++]='%';
  puts(q); }
```

(c) Observe the following C++ code very carefully and rewrite it after removing any/all syntactical errors with each correction underlined. 2

Note : Assume all required header files are already being included in the program.

```
#Define float Max=70.0;
void main()
{int Velocity
char wait='N';
cin>>Velocity;
if Velocity>Max
  wait='Y';
cout<<wait<<end;}
```

(d) Write the output of the following C++ program code : 2

Note : Assume all required header files are already being included in the Program.

```
void Position(int &C1,int C2=3)
{C1+=2;C2+=Y;}
void main()
{int P1=20, P2=4;
Position(P1);
cout<<P1<<" "<<P2<<end1;
Position(P2,P1);
cout<<P1<<" "<<P2<<end1; }
```

(e) Write the output of the following C++ program code : 3

Note : Assume all required header files are already being included in the program.

```
class Assess
{char Grade; int Bonus;
public:
  Assess ()
  {Grade='E'; Bonus=0;} void
  Down(int G)
  {Grade-=G;}
  void Up(int G)
  {Grade+=G; Bonus++; }
  void Show()
```

```

        {cout<<Grade<<"#"<<Bonus<<endl;}}};
void main()
{Assess A;
 A.Down(2);
 A.Show();
 A.Up(7);
 A.Show();
 A.Down(2);
 A.Show(); }

```

- (f) Study the following program and select the possible output(s) from the options (i) to (iv) following it. Also, write the maximum and the minimum values that can be assigned to the variable NUM.

2

Note :

–Assume all required header files are already being included in the program.

–random(n) function generates an integer between 0 and n – 1.

```

void main()
{randomize(); int NUM; NUM=random(3)+2;
 char TEXT[]="ABCDEFGHIJK";
 for (int I=1;I<=NUM; I++)
 {for(int J=NUM; J<=7;J++) cout<<TEXT[J];
 cout<<endl;}
}

```

- (i) FGHI (ii) BCDEFGH (iii) EFGH (iv) CDEFGH  
 FGHI BCDEFGH EFGH CDEFGH  
 FGHI EFGH  
 FGHI EFGH

2. (a) What is a copy constructor? Give a suitable example in C++ to illustrate with its definition within a class and a declaration of an object with the help of it.

2

- (b) Observe the following C++ code and answer the questions (i) and (ii)

```

class Passenger
{long PNR;
 char Pname[20];
 public :
     Passenger() //Function 1
     {cout<<"Ready"<<endl;}
     void Book(long P,char N[]) //Function 2
     {PNR = P; strcpy(Pname, N);}

     void Print() //Function 3
     {cout<<PNR << Pname <<endl;}

     ~Passenger() //Function 4
     {cout<<"Booking cancelled!"<<endl;}
};

```

- (i) Fill in the blank statements in Line 1 and Line 2 to execute Function 2 and Function 3 respectively in the following code :

1

```

void main()
{Passenger T;
 -----//Line1
 -----//Line2

} //Stops here

```

- (ii) Which function will be executed at  } //Stops here ? What is this function referred as ?

1

(c) Write the definition of a class EXHIBITS in C++ with following description :

4

Private Members

- Eno //Data member for exhibit Number (an integer)
- Category //Data member for exhibit Category (a string)
- Location //Data member for Exhibition Location (a string)
- FixLocation //A member function to assign //Exhibition Location as per category as shown in the following table

Category	Location
Science	Physics s Lab
Art	Kala Bhavan
Computer	Computer Lab

Public Members

- Enter() //A function to allow user to enter values //Eno, category and call FixLocation() function
- SeeAll() //A function to display all the data members

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

4

class Exterior

```
{int OrderId;
  char Address[20];
protected:
  float Advance;
public:
  Exterior();
  void Book(); void View(); };
class Paint:public Exterior
{int WallArea,ColorCode; protected:
  char Type;
public:
  Paint();
  void Pbook();
  void Pview();};
class Bill : public Paint
{float Charges; void Calculate();
public :
  Bill();
void Billing();
void Print();};
```

(i) Which type of Inheritance out of the following is illustrated in the above example ?

- Single Level Inheritance
- Multi Level Inheritance
- Multiple Inheritance

(ii) Write the names of all the data members, which are directly accessible from the member functions of class Paint.

(iii) Write the names of all the member functions, which are directly accessible from an object of class Bill.

(iv) What will be the order of execution of the constructors, when an object of class Bill is

declared ?

3. (a) Write the definition of a function `Change(int A[], int N)` in C++, which should change all the multiples of 5 in the array to 5 and rest of the elements as 0. For example, if an array of 10 integers is as follows : 2

A[0]	A[1]	A[2]	A[3]	A[4]	A[5]	A[6]	A[7]	A[8]	A[9]
55	43	20	16	39	90	83	40	48	25

After executing the function, the array content should be changed as follows :

A[0]	A[1]	A[2]	A[3]	A[4]	A[5]	A[6]	A[7]	A[8]	A[9]
5	0	5	0	0	5	0	5	0	5

- (b) A two dimensional array `P[20][50]` is stored in the memory along the row with each of its element occupying 4 bytes, find the address of the element `P[10][30]`, if the element `P[5][5]` is stored at the memory location 15000. 3

- (c) Write the definition of a member function `Pop()` in C++, to delete a book from a dynamic stack of TEXTBOOKS considering the following code is already included in the program. 4

```
struct TEXTBOOKS
{char ISBN[20];char TITLE[80]; TEXTBOOKS *Link; };
class STACK
{TEXTBOOKS *Top;
public:
STACK() {Top=NULL; }
void Push();
void Pop();
~STACK();};
```

- (d) Write a function `REVCOL (int P[][5], int N, int M)` in C++ to display the content of a two dimensional array, with each column content in reverse order. 3

Note : Array may contain any number of rows.

For example, if the content of array is as follows :

15	12	56	45	51
13	91	92	87	63
11	23	61	46	81

The function should display output as :

```
11  23  61  46  81
13  91  92  87  63
15  12  56  45  51
```

- (e) Convert the following infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion. 2

**X / Y + U\* (V-W)**

4. (a) Write function definition for `Hardwork()` in C++ to read the content of a text file `STORY.TXT`, count the presence of word `Hardwork` and display the number of occurrence of this word. 2

-	The word <code>Hardwork</code> should be an independent word
-	Ignore type cases (i.e. lower/upper case)

Example :

If the content of the file `STORY.TXT` is as follows :

<b>Hardwork shows others that we can do it. It is possible to achieve success with Hardwork. Lot of money can be earned with Hardwork.</b>
--

- The function Hardwork( ) should display: 3
- (b) Write a definition for function Priceless ( ) in C++ to read each record of a binary file ITEMS.DAT, find and display those items, which costs less than 2500. Assume that the file ITEMS.DAT is created with the help of objects of class ITEMS, which is defined below : 3

```
class ITEMS
{   int ID;char GIFT[20]; float Cost; public :
    void Get()
    {cin>>CODE;gets (GIFT) ;cin>>Cost;}
    void See()
    {cout<<ID<<" : "<<GIFT<<" : "<<Cost<<endl;}
    float GetCost(){return Cost;}};
```

- (c) Find the output of the following C++ code considering that the binary file CUSTOMER .DAT exists on the hard disk with records of 100 members. 1

```
class CUSTOMER
{int Cno;char Name[20];
public :
    void In(); void Out();};
void main()
{fstream FIN;
FIN.open ("CUSTOMER.DAT",ios::binary|ios::in);
CUSTOMER C;
FIN.read((char*) &C, sizeof(C));
FIN.read((char*) &C, sizeof(C));
FIN.read((char*) &C, sizeof(C));
int POS=FIN.tellg()/sizeof(C);
cout<<"PRESENT RECORD:"<<POS<<endl;
FIN.close();}
```

5. (a)Observe the following table carefully and write the names of the most appropriate columns, which can be considered as (i) candidate keys and (ii) primary key. 2

Id	Product	Qty	Price	Date of Purchase
101	MOUSE	100	3400	2014-12-14
104	PEN DRIVES	200	4500	2015-01-31
105	KEYBOARD	250	8000	2015-02-28
109	PRINTERS	10	40000	2015-03-12

- (b)Consider the following DEPT and WORKER tables. Write SQL queries for (i) to(iv) and outputs for (v) to (viii) 6

TABLE . DEPT

DCODE	DEPARTMENT	CITY
D01	ADMIN	DELHI
D02	MARKETING	DELHI
D03	CONSTRUCTION	MUMBAI
D05	ACCOUNTS	KOLKATA
D04	HUMAN RESOURCE	MUMBAI

TABLE : WORKER

WNO	NAME	DOJ	DOB	GENDER	DCODE
1001	Amit Bhatt	2013-09-02	1991-09-01	MALE	D01
1002	Shalini Verma	2012-12-11	1990-12-15	FEMALE	D03
1003	Sanchit Rai	2013-02-03	1987-09-04	MALE	D05
1007	Amit nathani	2014-01-17	1984-10-19	MALE	D04
1004	Mehul Desai	2012-12-09	1986-11-14	FEMALE	D01
1005	Amlesh Mishra	2013-11-18	1987-03-31	MALE	D02
1006	Shweta Shah	2014-06-09	1985-06-23	FEMALE	D05

**Note : DOJ refers to date of joining and DOB refers to date of Birth of workers.**

- (i) To display Wno, Name, Gender from the table WORKER in descending order of Wno.
- (ii) To display the Name of all the FEMALE workers from the table WORKER.
- (iii) To display the Wno and Name of those workers from the table WORKER who are born between '1987-01-01' and '1991-12-01'.
- (iv) To count and display MALE workers who have joined after '1986-01-01'.
- (v) **SELECT COUNT(\*), DCODE FROM WORKER  
GROUP BY DCODE HAVING COUNT(\*)>1;**
- (vi) **SELECT DISTINCT DEPARTMENT FROM DEPT;**
- (vii) **SELECT NAME, DEPARTMENT, CITY FROM WORKER W,DEPT D WHERE  
W.DCODE=D.DCODE AND WNO<1003;**
- (viii) **SELECT MAX(DOJ) , MIN(DOB) FROM WORKER;**

6.(a) Verify the following using Boolean Laws. 2

$$X + Y' = X.Y + X.Y' + X'.Y'$$

(b) Draw the Logic Circuit for the following Boolean Expression : 1  
 $(A + B').C' + D$

(c) Reduce the following using K Map: 3  
 $F(X,Y,Z,W) = \Sigma(0,1,6,8,9,10,11,12,15)$

2

(c) Find the Canonical SOP expression from the following truth table: 1

A	B	C	F
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

7. (a) Illustrate the layout for connecting 5 computers in a Bus and a Star topology of Networks. 1

(b) What is a spam mail ? 1

(c) Differentiate between ftp and http. 1

(d) Out of the following, which is the fastest (i) wired and (ii) wireless medium of communication ?

Infrared, Coaxial Cable, Ethernet Cable, Microwave, Optical Fiber 1

(e) What is Worm ? How is it removed ? 1

(f) Out of the following, which all comes under cyber crime ? 1

(i) Stealing away a brand new computer from a showroom.

(ii) Getting in someone's social networking account without his consent and posting pictures on his behalf to harass him.

(iii) Secretly copying files from server of a call center and selling it to the other organization.

(iv) Viewing sites on a internet browser.

(g) Bhavans College is an educational organization. It is planning to setup its campus at Chennai with its head office at Delhi. The Chennai campus has 4 main buildings – ADMIN, ENGINEERING, BUSINESS and MEDIA.

You as a network expert have to suggest the best network related solutions for their problems raised in (i) to (iv), keeping in mind the distances between the buildings and other given parameters.

Shortest distances between various buildings :

ADMIN to ENGINEERING	55m
ADMIN to BUSINESS	90m
ADMIN to MEDIA	50m
ENGINEERING to BUSINESS	55m
ENGINEERING to MEDIA	50m
BUSINESS to MEDIA	45m
DELHI Head Office to CHENNAI Campus	2175 KM

Number of Computers installed at various buildings are as follows :

ADMIN	110
ENGINEERING	75
BUSINESS	40
MEDIA	12
DELHI HEAD OFFICE	20

- (i) Suggest the most appropriate location of the server inside the CHENNAI campus (out of the 4 buildings), to get the best connectivity for maximum no. of computers. Justify your answer. 1
- (ii) Suggest and draw the cable layout to efficiently connect various buildings within the CHENNAI campus for connecting the computers. 1
- (iii) Which hardware device will you suggest to be procured by the company to be installed to protect and control the internet uses within the campus ? 1
- (iv) Which of the following will you suggest to establish the online face-to-face communication between the people in the Admin Office of CHENNAI campus and DELHI Head Office ? 1
- a Cable TV
  - b Email
  - c Video Conferencing
  - d Text Chat
-





A	B	C	F(A,B,C)
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1