



St. Xavier's Sr. Sec. School

Delhi-54

Pre Board Examination 2017
Std. 12
09-01-2017

Set 1

COMPUTER SCIENCE

Max. Marks : 70
Time : 3 hrs.

1. a) What is ternary operator? Explain with example. [1]
b) Write the names of header files (other than iostream.h), which are necessary to run the following program: [1]

```
main()
{ char c ;
  c=getchar( ) ;
  if (isdigit(c))
    cout<<"\nIt is a digit" ;
  if (isalpha(c))
    cout<<"\nIt is any alphabet" ;
  return 0;
}
```

- c) Rewrite the given code of statements after removing the syntactical error(s). Underline each correction. (assuming all the header files are included) [2]

```
class BOOK
{ long bid, qty;
  char BName[20];
public:
    BOOK()
    {   bid=qty=0;
        BName = NULL ;
    }
    void purchase() { cout<<bid<<qty<<BName; }
    void Amount( float p ) { return qty*p ; }
}
void main()
{
  B BOOK;
  B.purchase();
  cout<<Amount(500);
}
```

- d) Find the output of the following program segment with working (assume all necessary declarations are already made): [3]

```
void TRANSFER(int *n)
{   cout << "\n " << *n;
    cout << "\n " << *(n+2);
    cout << "\n " << (*(n+3)+1);
}
```



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```
        cout << "\n " << ++*n;
    }
    void main()
    { int ar[3][5] = { {1,2,3,4,5}, {6,7,8,9,10}, {11,12,13,14,15} };
      TRANSFER(ar);
      cout << "\n " << *(*ar)+2)+1;
      cout << "\n " << *(*ar+1)+3);
    }
```

- e) Write the output of the following C++ program code: (Assume all required header files are already being included in the program) [3]

```
class publication
{ char matter[30];
  int price;
public:
  publication()
  { strcpy(matter,"Xavier-Times");
    price=5000;
  }
  publication(char m[ ])
  { strcpy(matter,m);
    price=4000; }
  publication(int p)
  { strcpy(matter,"Xavier Fair Details");
    price=5000-p;
  }
  void Enter(char m[],int p)
  { strcpy(matter,m);
    price=price+p;
  }
  void Enter(int p=2000)
  { price=price+p; }
  void Headline(char m[],int p)
  { strcpy(matter,m);
    price=price+p;
  }
  void Display()
  { cout<<matter<<"@"<<price<<endl; }
};
void main()
{ publication p1,p2(1000),p3("Christmas Carols"),p4;
  p1.Display();
  p2.Display();
  p1.Headline("XF-DJ",2000);
  p1.Display();
  p2.Enter("Fair Picnic",2500);
```



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```
p2.Display();
p3.Enter();
p3.Display();
p4=p2;
p4.Display();
getch();
}
```

- f) Observe the following program & find out the correct possible outputs from the options. [2]
(Assuming that all required header files are included in the program)

```
void main( )
{ char Sections[ ][10] = {"12-A", "12-B", "12-C", "12-D", "12-E", "12-F" };
  randomize( );
  for(int i=0 ; i<4 ; i++)
    cout<<Sections[sizeof(char) + random(3)+1] ;
}
```

- i) Out of the six Sections stored in the array Sections, which Sections will never be displayed in output?
ii) Mention the minimum and maximum value of the index assigned to the string array Sections inside the loop.

2. a) Explain data hiding and Data Abstraction with one suitable real life example. [2]

- b) Observe the following C++ code and answer the questions (i) and (ii). Assume all necessary files are included : [2]

```
class FICTION
{
    long FCode;
    char FTitle[20];
    float FPrice;
public:
    FICTION() //Member Function 1
    {   cout<<"Bought"<<endl;   FCode=100;
        strcpy(FTitle,"Noname"); FPrice=50;   }
    FICTION(int C,char T[],float P) // Member Function 2
    {   FCode=C;   strcpy(FTitle,T);   FPrice=P;   }
    FICTION( FICTION &F) ; // Member Function 3
    void Increase(float P) // Member Function 4
    {   FPrice+=P;   }
    void Show() // Member Function 5
    {   cout<<FCode<<":"<<FTitle<<":"<<FPrice<<endl;   }
    ~FICTION() // Member Function 6
    {   cout<<"Fiction removed!" <<endl;   }
};
void main() //Line 1
{ //Line 2
    FICTION F1,F2(101,"Dare",75); //Line 3
    for (int I=0;I<4;I++) //Line 4
    {   F1.Increase(20);   F2.Increase(15); //Line 5
```



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```
F1.Show();          F2.Show();          //Line 6
    }                }                //Line 7
}                    }                //Line 8
```

i) How many times the message "Fiction removed!" will be displayed after executing the above C++ code? Out of Line 1 to Line 8, which line is responsible to display the message "Fiction removed!"?

ii) Write definition of Member Function 3 outside the class. Also write the statement to invoke this

member function.

c) Define a class Departmental with the following specification : 4

private data members :-

Prod_name string (45 charactes) [Product name]

Listprice long

Dis_Price long [Discount Price]

Net long [Net Price]

Dis_type char(F or N) [Discount type]

Cal_price() –The store gives a 10% discount on every product it sells. However at the time of festival season the store gives 7% festival discount after 10% regular discount.

The discount type can be checked by tracking the discount type. Where 'F' means festival and 'N' means Non- festival .The Cal_price() will calculate the Discount Price and Net Price on the basis of the following table.

Product Name	List Price(Rs.)
Washing Machine	12000
Colour Television	17000
Refrigerator	18000
OTG	8000
CD Player	4500

public members : -

Constructor to initialize the string elements with "NULL", numeric elements with 0 and character elements with 'N'

Accept() - Ask the store manager to enter Product name, list Price and discount type . The function will invoke Cal_price() to calculate Discount Price and Net Price .

ShowBill() - To generate the bill to the customer with all the details of his/her purchase along with the bill amount including discount price and net price.

d) Give the following class definition answer the question that is follow: [4]

```
class University
{
    char name [20];
    protected :
    char vc[20];
    void estd();
    public :
    University();
```



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```
void inputdata();
void outputdata();
};
class College : protected University
{ int regno;
protected:
char principal[20];
public :
int no_of_students;
void readdata();
College();
void dispdata ( );
};
class Department : public College
{ char name[20];
char HOD[20];
public :
void fetchdata(int);
Department();
void displaydata( );
};
```

- i) Name the type of inheritance illustrated in the above C++ code.
 - ii) Write the names of all the data members, which are accessible from the member function dispdata() belonging to class College.
 - iii) Write the names of all the members, which are accessible from the object of class Department.
 - iv) What will be the size of the objects belonging to class College and Department?
3. a) Write a function in C++ which accepts an integer array and its size as arguments and replaces elements having even values with its half and elements having odd values with twice its value. [3]
- Eg. If an array of five elements initially contains the elements as
3, 4, 5, 16, 9
Then the function should rearrange the content of the array as
6, 2, 10, 8, 18
- b) A double non-C++ type array A[-10..20][15] is stored in the memory along with Row. Find out the base address and address of the element Array[2][3] if the element Array[4][5] is stored at the address 1000. [3]
- c) Write a function InsertPlayer() in C++ to insert values from the user from a dynamic Queue implemented with the help of following structure. Also write function DisplayPlayers() which displays all the players present in the queue. [4]
- ```
struct Cricket
{ int Pid; // Player ID
char Pname[20]; // Player Name
char Type[20]; // Batsman or Bowler or Keeper or Others
```



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```
Cricket *next;
};
class Player
{
 Cricket *Front, *Rear;
public:
 Player() { Front = Rear = NULL; }
 void InsertPlayer();
 void DeletePlayer();
 void DisplayPlayers();
 ~Players();
};
```

- d) Write a function in C++ which accepts a 2D array of integers and its size as arguments and displays elements which are exactly two digit number. [2]

If 2D array is

|      |     |     |      |
|------|-----|-----|------|
| 129  | 3   | 9   | 14   |
| 2    | 25  | 146 | 1431 |
| 1924 | 32  | 45  | 327  |
| 11   | 455 | 28  | 18   |

Output is : - 14 25 32 45 11 28 18

- e) Evaluate the following postfix expression using a stack and show the contents of the stack at

each step: 100, 40, 8, +, 20, 10, -, +, \*

[2]

4. a) A binary file "Students.dat" contains data of 4 students where each student's data is an object of the following class: [1]

```
class Student
{
 int Rno ; char Name[20] ;
public:
 void EnterData () { cin>>Rno ; gets(Name) ;
 void ShowData () { cout<<Rno<<" - "<<Name<<endl ; }
};
```

With reference to this information, write output of the following program segment(assume all necessary declarations are given):

```
ifstream File;
Student S;
File.open("STUDENTS.DAT" , ios: :binary | ios: :in) ;
```

```
while(File)
{
 File.read((char*)&S, sizeof(S));
 File.read((char*)&S, sizeof(S));
 if(File.eof())
 break;
 else
 cout<<"\n"<<File.tellg();
```



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}

- b) Write a function CountYouMe( ) in C++ which reads the contents of a text file story.txt and counts the words You and Me (not case sensitive). [2]

For example, if the file contains:

You are my best friend.  
You and me make a good team.  
I will never lose a good friend like you.  
And you never forget me.

The function should display the output as

Count for You: 4  
Count for Me : 2

- c) Write a function in C++ to search for a camera from a binary file "CAMERA DAT" containing the objects of class CAMERA (as defined below). The user should enter the Model No. and the function should search and display the details of the CAMERA else NOT FOUND message. [3]

```
class CAMERA
{
 long ModelNo;
 float Megapixel;
 int Zoom;
 char Details[120];
public:
 void Enter()
 {
 cin>>ModelNo>>Megapixel>>Zoom;
 gets(Details) ;
 }
 void Display()
 {
 cout<<ModelNo<< Megapixel<<Zoom<<Details<<endl;
 }
 long GetModelNo()
 {
 return ModelNo; } };
```

5. a)

## HOSPITAL

| No | Name    | Age | Department       | Dateofadm | Charges | Gender |
|----|---------|-----|------------------|-----------|---------|--------|
| 1  | Sandeep | 65  | Surgery          | 23/02/98  | 300     | M      |
| 2  | Ravina  | 24  | Orthopedic       | 20/01/98  | 200     | F      |
| 3  | Karan   | 45  | Orthopedic       | 19/02/98  | 200     | M      |
| 4  | Tarun   | 12  | Surgery          | 01/01/98  | 300     | M      |
| 5  | Zubin   | 36  | ENT              | 12/01/98  | 250     | M      |
| 6  | Ketaki  | 16  | ENT              | 24/02/98  | 300     | F      |
| 7  | Ankita  | 29  | Cardiology       | 20/02/98  | 800     | F      |
| 8  | Zareen  | 45  | Gynecology       | 22/02/98  | 300     | F      |
| 9  | Kush    | 19  | Cardiology       | 13/01/98  | 800     | M      |
| 10 | Shailya | 31  | Nuclear Medicine | 19/02/98  | 400     | F      |



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- i) What is the cardinality and degree of the above given table? [1]  
 ii) If a new column Docname is added and five more patient details entered in hospital table then how these changes will affect the degree and cardinality of the above given table. [1]
- b) Consider the tables PURCHASE & CUSTOMER given below, write queries for (i) to (iv) and output for (v) to (viii) [6]

CUSTOMER

| Customer_ID | First_Name | Last_Name | DateOfBirth |
|-------------|------------|-----------|-------------|
| 1           | Alisha     | Madan     | 20/01/1989  |
| 2           | Akhil      | Sachdeva  | 01/02/1990  |
| 3           | Rajesh     | Madan     | 10/09/1989  |
| 4           | Rani       | Garg      | 24/11/1986  |

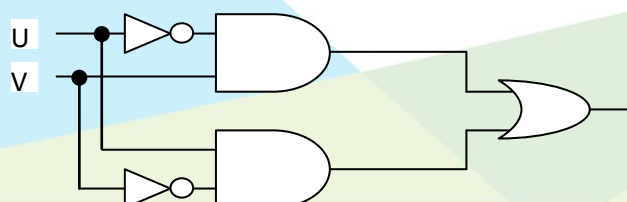
PURCHASE

| Customer_ID | Date       | Purchase_Amount |
|-------------|------------|-----------------|
| 3           | 11/09/2010 | 200             |
| 1           | 14/10/2010 | 199             |
| 2           | 21/09/2010 | 600             |
| 1           | 01/09/2010 | 99              |
| 3           | 23/11/2010 | 300             |

- i) Display the first name, last name and purchaseAmount of all the customers.  
 ii) Display the first name of all customers whose birth year is 1989.  
 iii) Display first name and date of birth whose last name is 'Madan'  
 iv) Display total purchase amount for each customer.  
 v) SELECT Last\_Name, Purchase\_amount \* 0.10 "Discount" from Customer, purchase where customer.Customer\_ID= Purchase.Customer\_ID and purchase\_amount >300;  
 vi) Select First\_Name , Date from Customer C, purchase P where C.Customer\_ID != P.Customer\_ID ;  
 vii) Select Date , Sum( Purchase\_Amount + Customer\_ID ) from Purchase where customer\_ID>1 group by Date;  
 viii) Select Min(DateOfBirth), Max(DateOfBirth) from customer;

6. a) Correct the following Boolean statements: [2]
- i)  $(X')' = X'$   
 ii)  $A \cdot A' = 1$   
 iii)  $1 + A = A$   
 iv)  $(A \cdot B)' = A + B$

- b) Write the equivalent Boolean Expression for the following Logic Circuit. [1]







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

[1]

| A | B | C | F |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 |
| 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. Draw the logic circuit also.

[3]

$$F(A,B,C,D)=\Sigma(0,1,2,4,5,6,8,10,11,14,15)$$

e) What will the dual form of given expression:

[1]

$$(A+B)'(A'+B')A'B'$$

7 a) Identify the type of topology used for each of the following case :

[3]

- Since every node is directly connected to the server, a large amount of cable is needed.
- Which increases the installation cost of the network as many sub networks are connected.
- It has a single common data path connecting all the nodes.

b) Expand the following terms with respect to Networking.

[1]

- (i) FDM      (ii) CDMA

c) The following is a 32 bit binary number usually represented as 4 decimal values, each representing 8 bits, in the range 0 to 255 (known as octets) separated by decimal points.

[1]

196.108.209.078

What is it? What is its importance?

d) Name two protocols used in sending messages via electronic mail.

[1]

e) "China Middleton Fashion" is planning to expand their network in India, starting with two cities in India to provide infrastructure for distribution of their product. The company has planned to set up their main office units in Chennai at three locations and have named their offices as "Production Unit", "Finance Unit" and "Media Unit". The company has its corporate unit in New Delhi. A rough layout of the same is as follows:

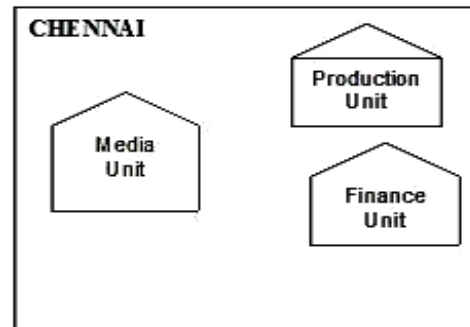
[4]



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Approximate distances between these Units is as follows:

| From            | To             | Distance |
|-----------------|----------------|----------|
| Production Unit | Finance Unit   | 70 mtrs  |
| Production Unit | Media Unit     | 15 KM    |
| Production Unit | Corporate Unit | 2112 KM  |
| Finance Unit    | Media Unit     | 15 KM    |

In continuation of the above, the company experts have planned to install the following number of computers in each of their office units:

|                 |     |
|-----------------|-----|
| Production Unit | 150 |
| Finance Unit    | 35  |
| Media Unit      | 10  |
| Corporate Unit  | 30  |

- i) Suggest the kind of network required (out of LAN, MAN, WAN) for connecting each of the following office units:
  - Production Unit and Media Unit
  - Production Unit and Finance Unit
- ii) Which one of the following devices will you suggest for connecting all the computers within each of their office units?
  - Switch/Hub
  - Modem
  - Telephone
- iii) Which of the following communication media, will you suggest to be procured by the company for connecting their local offices in Chennai for very effective (High Speed) communication?
  - Ethernet cable
  - Optical fibre
  - Telephone cable



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- iv) Suggest a cable/wiring layout for connecting the company's local office units located in Chennai. Also, suggest an effective method/technology for connecting the company's office unit located in Delhi.

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