

Roll No.

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Candidates must write the Code on the title page of the answer book.

- Please check that this question paper contains 13 printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer book by the candidate.
- Please check that this question paper contains 7 questions.
- **Please write down the serial number of the question before attempting it.**
- 15 minutes time has been allotted to read this question paper. The students will read the question paper only and will not write any answer on the answer script during this period.

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First Pre-Board Examination , 2017-2018

Computer Science

Grade : 12

Time: 3 hours

Date:00.00.0000

Max Marks:70

General Instructions:

- i. All questions are compulsory.*
- ii. Answer the questions after carefully reading the text.*

1.

- (a) Out of the following, find those identifiers, which cannot be used for naming Variables, Constants or Functions in a C++ program: (2)

Cost, Price*Qty, float, Switch, Address One, Delete, Number12, do

- (b) Jayapriya has started learning C++ and has typed the following program. When she compiled the following code written by her, she discovered that she needs to include some header files successfully compile and execute it. Write the names of those header files, which are required to be included in this code. (2)

```
void main()
```

```
{
```

```
float A, Number, Outcome;
```

```
cin>>A>>Number;
```

```

Outcome=pow(A,Number);
cout<<Outcome<<endl;
}

```

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

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

```

#define MAX(10);
void main()
{
Float p=10.6;
int *ptr=&p;
int &x=*ptr;
while(x<=MAX& x>=0)
{
cout<<+*ptr++2<<endl;
x+= - 2;
}
getch();
}

```

- (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 reposition (int *p, int n)
{
for(int i=0;i<n;i++)
{
if(i%2!=0)
{
*p=2 * *p;
}
else
*p=3 * *p;
p++;
}
}

```

```

void main()
{
clrscr();
int a[ ]={2,3,5,6,7,8,10};
reposition(a,7);
for(int i=0;i<7;i++)
{
cout<<a[i]<<" ";
}
}

```

(e) Look at the following C++ code and find 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 CHANGER. (2)

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

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

```

void main()
{
randomize();
int CHANGER;
CHANGER=random(3);
char CITY[ ][25]={"DELHI","MUMBAI","KOLKATA","CHENNAI"};
for(int l=0;l<=CHANGER;l++)
{
for( int J=0;J<=l;J++)
cout<<CITY[J];
cout<<endl;
}
}

```

(i)	(ii)	(iii)	(iv)
DELHI	DELHI	MUMBAI	KOLKATA
DELHIMUMBAI	DELHIMUMBAI	MUMBAIKOLKATA	KOLKATACHENNAI
DELHIMUMBAIKOLKATA	DELHIMUMBAIKOLKATA	MUMBAIKOLKATACHENNAI	
	DELHIMUMBAIKOLKATACHENNAI		

2.
(a) Write any two similarities between Constructor and Destructor. Write the function header for constructor and destructor of a class **Flight**. (2)

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

```
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;
  }
  void Increase(float P)        //Member Function 3
  {   FPrice+=P;
  }
  void Show()                   //Member Function 4
  {   cout<<FCode<<":"<<FTitle<<":"<<FPrice<<<endl;
  }
  ~ FICTION()                  //Member Function 5
  {   cout<<"Fiction removed!"<<endl;
  }
};

void main()                    //Line 1
{                               //Line 2
  FICTION F1,F2(101,"Dare",75); //Line 3
  for(int l=0;l<4;l++)         //Line 4
  {                             //Line 5
      F1.Increase(20); F2.Increase(15); //Line 6
      F1.Show(); F2.Show(); //Line 7
  }                             //Line 8
}                               //Line 9
```

(i) Which specific concept of object oriented programming out of the following is illustrated by Member Function 1 and Member Function 2 combined together? (1)

- Data Encapsulation
- Data Hiding
- Polymorphism
- Inheritance

(ii) How many times the message “Fiction removed!” will be displayed after executing the above C++ code? Out of Line 1 to Line 9, which line is responsible to display the message “Fiction removed!”? (1)

(c) Define a class **Bus** in C++ with the following specifications: (4)

Data Members

- Busno - to store Bus No
- From – to store Place name of origin
- To – to store Place name of destination
- Type – to Store Bus Type such as ‘O’ for ordinary
- Distance – to store the Distance in Kilometers
- Fare – to store the Bus Fare

Member Functions

- A constructor function to initialize Type as ‘O’ and Freight as 500
- A function CalcFare() to calculate Fare as per the following criteria:

Type	Fare
‘O’	15*Distance
‘E’	20*Distance
‘L’	24*Distance

- A function **Allocate()** to allow user to enter values for **Busno, From, To, Type** and **Distance**. Also this function should call **CalcFare()** to calculate Fare.
- A function **Show()** to display the content of all the data members on screen.

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

```
class Normal
{
    char Ccode[10];
public:
    Normal();
    void Input();
    void Output();
};
```

```

class Live
{
    char Wcode[50];
    public:
        Live();
        void LIn();
        Void LOut();
};
class Teacher:public Normal,private Live
{
    long Tcode;
    float Fees;
    int Time;
    public:
        Teacher();
        void Register();
        void Show();
}

```

- (i) Which type of inheritance out of the following is illustrated in the above example? (1)
- Single Level Inheritance
 - Multi Level Inheritance
 - Multiple Inheritance
- (ii) Write the names of all the data members, which are accessible from the member functions of class Paint. (1)
- (iii) Write the names of all the member functions accessible from Show() function of class Teacher. (1)
- (iv) What will be the order of execution of constructors, when an object of class Teacher is declared? (1)

3. (a) Write a function CountYouMe() in C++ which reads the contents of a text file **story.txt** (1)

and counts the words **You** and **Me** (not case sensitive)

For example, if the file contains

You are my best friend.

You and me make a good team

The function should display the output as

Count for you:2

Count for me:1

- (b) Write a definition for function SEARCH() in C++ to read each record of a binary file TOYS.DAT , find and display those toys, which are priced more than 50. Assume that the file TOYS.DAT is created with the help of objects of class TOYS, which is defined below (3)

```
class TOYS
{
int TCODE;
char TNAME[20];
float Price;
public:
    void GET()
    {
        cout<<" Enter toy code,toy name,price";
        cin>>TCODE;
        gets(TNAME);
        cin>>Price;
    }
    void PUT()
    {
        cout<<"TOY CODE:"<<TCODE<<endl;
        cout<<"TOY NAME;"<<TNAME<<endl;
        cout<<"TOY PRICE:"<<Price<<endl;
    }
    float returnPrice()
    {return Price;}
};
```

- (c) Find the output of the following C++ program code. Considering that the binary file STUDENT.DAT exists on the hard disk with records of 10 students. (3)

```
class student
{
    int adno;
    char name[20];
public:
    void getdata()
    {
        cout<<"\n Enter the admission no:";
        cin>>admno;
        cout<<"\nEnter name of the student:";
        gets(name);
    }
};
```

```

void showdata()
{
    cout<<"\n Admission No: "<<admno;
    cout<<"\n Name:";
    puts(name);
}
int retadmno()
{return admno;}
};
void main()
{
    fstream SF;
    SF.open("STUDENT.DAT",ios::binary|ios::out|ios::app);
    student S;
    S.getdata();
    SF.write((char*)&S,sizeof(S));
    S.getdata();
    SF.write((char*)&S,sizeof(S));
    int LOC=SF.tellp()/sizeof(S);
    cout<<"Total records in file:"<<LOC;
    SF.close();
}

```

- 4.
- (a) Comment on the efficiency of linear and binary search in relation to the number of elements in the list being searched (1)
- (b) Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion. (2)
- A+(B-C)*D-(E/F)^G+H
- (c) Write the definition of a function Alter(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 follow:

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

(d) T[20][50] is a two dimensional array, which is stored in the memory along the row with each of its element occupying 4 bytes, find the address of the element T[15][5], if the element T[10][8] is stored at the memory location 52000. (3)

(e) 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

(f) Write the definition of a member function PUSH() in C++, to add a new book in a dynamic stack of BOOKS considering the following code is already included in the program:

```
struct BOOKS  
{ char ISBN[20], TITLE[80];  
  BOOKS *Link;  
};  
class STACK  
{BOOKS *Top;  
public:  
  STACK()  
{ Top=NULL;  
}  
  void PUSH();  
  void POP();  
  ~STACK();  
};
```

(3)

(g) Write the definition of a member function INSERT() for a class QUEUE in C++, to insert an ITEM in a dynamically allocated Queue of items considering the following code is already written as part of the program. (3)

```

struct ITEM
{
int INO; char INAME[20];
ITEM *Link;
};
class QUEUE
{
    ITEM *R,*F;
    public:
    QUEUE() { R=NULL;F=NULL;}
    void INSERT();
    void DELETE();
    ~QUEUE();
};

```

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	Transaction Date
101	Plastic Folder 12"	100	3400	2014-12-14
104	Pen Stand Standard	200	4500	2015-01-31
105	Stapler Medium	250	1200	2015-02-28
109	Punching Machine Big	200	1400	2015-03-12
103	Stapler Mini	100	1500	2015-02-02

- (b) Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), Which are based on the tables.

Table: VEHICLE

VCODE	VEHICLETYPE	PERKM
V01	VOLVO BUS	150
V02	AC DELUXE BUS	125
V03	ORDINARY BUS	80
V05	SUV	30
V04	CAR	18

Note PERKM is Freight Charges per kilometer.

Table: TRAVEL

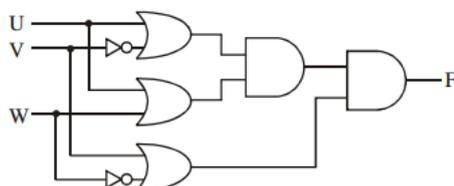
CNO	CNAME	TRAVELDATE	KM	VCODE	NOP
101	K.Niwal	2015-12-13	200	V01	32
103	Fredrick Sym	2016-03-21	120	V03	45
105	Hitesh Jain	2016-04-23	450	V02	42
102	Ravi Anish	2016-01-13	80	V02	40
107	John Malina	2015-02-10	65	V04	2
104	Sahanubhuti	2016-01-28	90	V05	4
106	Ramesh Jaya	2016-04-06	100	V01	25

Note : - KM is kilometers travelled

- NOP is number of passengers travelled in vehicle.

- (i) To display CNO,CNAME,TRAVELDATE from the table TRAVEL in descending order of CNO. (1)
- (ii) To display the CNAME of all the customers from the table TRAVEL who are travelled by vehicle with code V01 or V02. (1)
- (iii) To display the CNO and CNAME of those customers from the table TRAVEL who travelled between '2015-12-31' and '2015-05-01'. (1)
- (iv) To display all the details from table TRAVEL for the customers, who have travel distance more than 120 KM in ascending order of NOP. (1)
- (v) SELECT COUT(*) ,VCODE FROM TRAVEL
GROUP BY VCODE HAVING COUNT(*) > 1; (1/2)
- (vi) SELECT DISTINCT VCODE FROM TRAVEL; (1/2)
- (vii) SELECT A.VCODE,CNAME,VEHICLETYPE
FROM TRAVEL A, VEHICLE B
WHERE A.VCODE=B.VCODE AND KM<90; (1/2)
- (viii) SELECT CNAME ,KM*PERKM
FROM TRAVEL A,VEHICLE B
WHERE A.VCODE=B.VCODE AND A.VCODE='V05'; (1/2)

- 6.
- a) Verify the following using Boolean laws: (2)
- $$X'+Y'Z=X'.Y'.Z'+X'.Y.Z'+X'.Y.Z+X'.Y'.Z+X.Y'.Z$$
- b) Write the Boolean Expression for the result of the Logic Circuit as shown below: (2)



- c) Derive a Canonical POS expression for a Boolean Function F, represented by the following truth table: (2)

P	Q	R	F(P,Q,R)
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

- d) Obtain a simplified form for the Boolean expression: (3)

$$F(U,V,W,Z)=\pi(0,1,3,5,6,7,15)$$

7.

- (a) Differentiate between ftp and http. (1)

- (b) Expand the following: (1)

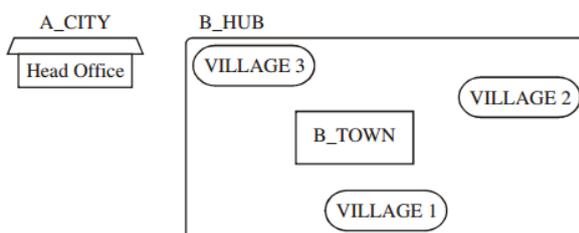
(i) VOIP (ii)SMTP

- (c) What is the basic difference between Computer Worm and Trojan Horse? (1)

- (d) Categorize the following under client side or server side script. (1)

(i) Java Script (ii) ASP (iii) VB Script (iv) JSP

- (e) Uplifting Skills Hub India is a knowledge and skill community which has an aim to uplift the standard of knowledge and skills in the society. It is planning to setup its training centers in multiple towns and villages pan India with its head offices in the nearest cities. They have created a model of their network with a city, a town and 3 villages as follows. As a network consultant, you have to suggest the best network related solutions for their issues problems raised in (i) to (iv) keeping in mind the distances between various locations and other given parameters.



Shortest distance between various locations:

VILLAGE 1 to B_TOWN	2 KM
VILLAGE 2 to B_TOWN	1.0 KM
VILLAGE 3 to B_TOWN	1.5 KM
VILLAGE 1 to VILLAGE 2	3.5 KM
VILLAGE 1 to VILLAGE 3	4.5 KM
VILLAGE 2 to VILLAGE 3	2.5 KM
A_CITY Head Office to B_HUB	25 KM

Number of Computers installed at various locations are as follows:

B_TOWN	120
VILLAGE 1	15
VILLAGE 2	10
VILLAGE 3	15
A_CITY OFFICE	6

Note:

- In Villages, there are community centers, in which one room has been given as training center to this organization to install computers.
- The organization has got financial support from the government and top IT companies.

- (i) Suggest the most appropriate location of the SERVER in the B_HUB (1)
(out of the 4 locations), to get the best and effective connectivity, Justify your answer.
- (ii) Suggest the best wired medium and draw the cable layout (location to location) to efficiently connect various locations within the B_HUB. (1)
- (iii) Which service/protocol will be most helpful to conduct live interactions of Experts from Head Office and people at all locations of B_HUB ? (1)