

COMMON PRE-BOARD EXAMINATION 2017-2018
COMPUTER SCIENCE

CLASS XII

Time Allowed: 3 hours

Maximum Marks: 70

General Instructions:

- (a) All questions are compulsory
- (b) Answer either Section A or Section B:
(i) Section A - Programming Language with C++
(ii) Section B - Programming Language with Python
- (c) Section C is compulsory.

SECTION A (C++)

1. a) What is the difference between a macro and an user defined function? Give a suitable example to illustrate using C++ code. (2)
- b) Observe the following C++ code and write the name(s) of the header file(s), which will be essentially required to run in a C++ compiler. (1)

```
void main()
{
char ch, next;
cout<<"Enter any character";
ch=getchar();
next=ch + 1;
cout<<"The next character is";
putchar(ch);
}
```

- c) Nisha has just started working as a programmer in the CYBER WORLD SOFTWARE company. In the company, she has got her first assignment to develop a small C++ module for the following scenario:

When an airplane is ready to take off, the pilot calls air traffic control to notify them. The number of the airplane, the time it was due to take off and the time called in are added to a list. The due time is taken from a central database containing details of airplanes. A function DUETIME(PLANE) returns this value for a given plane identifier. When there is a free runway, the first plane on the list is called to take off.

The airplane identifier, call time and due time are stored in three arrays, PLANE, DUE and CALL. An entry of zzz in the PLANE array indicates that there are no further airplanes waiting. (Due time and call time are both stored as minutes since midnight.)

For example, when there are three planes waiting, the arrays could be as follows:

PLANE	DUE	CALL
AF344	956	850
LH543	955	875
BD556	950	860
ZZZ		

The following procedure was written by Nisha that displays the identifier of the next airplane to take off and returns the number of airplanes left in the list. In addition, the procedure moves the remaining airplanes up the list. But the code was not giving the desired output. Find out the mistakes and correct this C++ code to help Nisha to get the desired result. Underline each correction. (2)

```
void NEXTPLANE (char PLANE[][20], int CALL[], DUE[] )
{
int COUNT ;
cout<< PLANE (0);
COUNT=0;
while ( PLANE(COUNT)!="ZZZ")
{
PLANE [COUNT] =PLANE [COUNT+1];
CALL [COUNT] =CALL [COUNT+1]
DUE [COUNT] =DUE [COUNT+1];
COUNT=COUNT+1;
}
return COUNT;
}
```

d) Obtain the output from the following C++ program as expected to appear on the screen after its execution.

Important Note:

(2)

- All desired header files are already included in the code, which are required to run the code.

```
void change (char* state, int &s)
{ int b = s;
for (int x = 0; s>=0; x++, s- -)
if ((x+s)%2)
*(state+x) = toupper(*(state+b-x));
}
void main ( )
```

```

{
char s[ ] = "Punjab";
int b = strlen (s) - 1;
change (s, b);
cout<<s<<"#"<<b;
}

```

e) Obtain the output from the following C++ program as expected to appear on the screen after its execution.

Important Note:

(3)

- All desired header files are already included in the code, which are required to run the code.

```

class OUTPUT
{
int C, T, S;
char A[100];
public:
OUTPUT(char B[] = "Try.")
{
C=T=S=0;
strcpy(A,B);
}
void Report();
int Calculate();
};

void main()
{
OUTPUT O1("it is."), O2;
int X=O1.Calculate();
O2.Report();
int Y=O2.Calculate();
O1.Report();
cout<<X<<"&"<<Y;
getch();
}

void OUTPUT::Report()
{
cout<<A<<"#"<<C<<"#"<<T<<"#"<<S<<endl;
}

int OUTPUT::Calculate()
{
do
{
(A[S]==' ')?C++:T++;
S++;
}while(A[S]!='. ');
if(C==0)

```

```

return T+1;
else
return T/C+1;
}

```

f) Read the following C++ code carefully and find out, which out of the given output options (i) to (iv) are the expected correct output(s) of it. (2)

```

#include<stdlib.h>
#include<iostream.h>
void main()
{
randomize();
char city[ ][5]={"MCT", "EKM", "TVM", "KOL", "CAL"};
int ZEN;
for(int i=0;i<3;i++)
{
ZEN=random(2)+1;
cout<<city[ZEN]<<"@";
}
}

```

- (i) MCT@ EKM @TVM@
- (ii) EKM @TVM@ EKM @
- (iii) TVM@KOL@CAL@
- (iv) TVM@ EKM @TVM@

2. a) What is data abstraction? Write an example in C++ to illustrate the concept of data abstraction. (2)

b). Answer the questions (i) and (ii) after going through the following class: (2)

```

class Travel
{
int days;
public:
Travel ( ) // Function 1
{
Days = 50;
cout << " Journey starts now" << endl;
}
void sightseeing( ) // Function 2
{
cout << " Sight-seeing in the journey starts" << endl;
}
Travel (int Duration) // Function 3
{
Days = Duration; cout << " Journey starts now" << endl;
}
~ Travel ( ) // Function 4
{
cout << " Happy journey" << endl;
}
}

```

```
}  
};
```

- i) In Object Oriented Programming, which concept is illustrated by Function 1 and Function 3 together? Write an example illustrating the calls for these functions.
- ii) How is Function 4 different from Function 3?
- c) Define a class BODYMASSINDEX with the following specification: (4)

Data Members

- Name
- Height
- Weight
- BMI

Member function

- A constructor function that initialize Height as 0.0, Weight as 0.0 and BMI as 0.0
- A function INPUT() to allow to enter the values for Name, Height (in meters) and Weight (in KGs)
- A function CALCULATEBMI() using the formula $BMI = \text{Weight} / (\text{Height} * \text{Height})$
- A function DISPLAY() to display the appropriate message on screen as per the following conditions:

BMI	Message to be displayed
>30	Extremely Fat
>25 and <=30	Fat
>22 and <=25	Over Weight
>=20 and <=22	Normal Weight
<20	Under Weight

- d) Consider the following C++ code and answer the questions from (i) to (iv): (4)

```
class PRODUCT  
{  
  char P_Code[20];  
  char P_Name[25];  
public:  
  PRODUCT();
```

```

~PRODUCT();
void getproduct();
void putproduct();
protected:
float price;
};

```

```

class MILK_PRODUCTS : protected PRODUCT
{
protected:
float weight;
public:
void getmilkproduct();
void putmilkproduct();
char brand[25];
MILK_PRODUCTS;
~MILK_PRODUCTS;
};

```

```

class FRUIT_PRODUCTS : public PRODUCT
{
char M_date[10];
char E_date[10];
public:
FRUIT_PRODUCTS();
~FRUIT_PRODUCTS();
void getfruitproducts();
void putfruitproducts();
};

```

- i) Is it possible to call function getproduct() of PRODUCT class from an object of class MILK_PRODUCTS? (Answer as Yes or No)
 - ii) How many bytes will be occupied by an object of class FRUIT_PRODUCTS?
 - iii) Write the names of those member functions, which are directly accessible from an object of class FRUIT_PRODUCTS .
 - iv) Which type of inheritance is shown in the above example?
3. a) An international business with branches in several countries sells educational products to schools. Each branch keeps details about the schools it sells to. Two branches decide to combine their data, since some schools appear on the lists of both branches. The data are in arrays CODE1 and COUNTRY1 for the first branch, and CODE2 and COUNTRY2 for the second branch. Write an user defined function TRANSFER(int CODE1[], char COUNTRY1[][25], int CODE2[], char COUNTRY2[][25], int CODE3[], char COUNTRY3[][25], int M, int N) that transfer the data to CODE3 and COUNTRY3. (If the same school appears in both branches, only one set of data should be transferred.) (3)

For example, the following transfer would occur:

CODE1	COUNTRY1	CODE2	COUNTRY2	CODE3	COUNTRY3
0101	Zaire	0178	Chile	0101	Zaire
0178	Chile	0540	Australia	0178	Chile
0417	Chile	0925	Brazil	0417	Chile
0925	Brazil	9999	ZZZ	0540	Australia
9999	ZZZ			0925	Brazil
				9999	ZZZ

b) An array MAT[20][12] is stored in the memory column wise with each element occupying 2 bytes of memory. Find out the address of element MAT[15][10] , if the location of MAT[2][4] is stored at the address 1000. Also, find the total number of elements present in the MAT array. (3)

c) Write an user defined function AddEnd3(int X[][5],int R, int C) in C++ to display the sum of the elements, which are ending with 3. (2)

For example if the content of the array is :

3	12	13
44	10	60
43	22	53

The output should be 112

d) 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) (2)

e) Write a function in C++ to perform a **DELETE** operation in a **dynamically allocated queue** considering the following description : (4)

```

struct Node
{
    float U, V ;
    Node *Link ;

};

class QUEUE
{
    Node *Rear, *Front ;
public :
    QUEUE()
    {
        Rear = NULL ;
        Front = NULL ;
    }
}

```

```

}
void INSERT( );
void DELETE( );
~ QUEUE( );
};

```

4. a) Observe the program segment given below carefully and fill the blanks marked as **Statement 1** and **Statement 2** using seekg(), seekp(), tellg(), and tellp() functions for performing the required task (1)

```

#include <iostream.h>
#include<fstream.h>
#include<stdlib.h>
class ITEM
{
int ino;
char iname[20];
float price;
public:
void InputItem(){...} // To input details of item.
void ShowItem(){...} // To display details of item.
int getIno( ) { return ino; }
};
void Modify( )//To modify ITEM.
{
fstream File;
ITEM It;
int cino;
File.open("ITEM.DAT", ios::binary | ios::in | ios::out);
cout << "ITEM No to modify : ";
cin>> cino;
while(File.read((char*)&It, sizeof(ITEM))
{
if(cino == It.getIno( ))
{
cout << "Enter New Details of Item\n";
It.InputItem();
int FilePos = _____; //Statement 1
_____ ; //Statement 2
File.write((char *)&It, sizeof(ITEM)); //Re-writing record
}
}
File.close( );
}

```

- b) Write a function in C++ to count the no of “you” or “me” words present in a text file “MESSAGE.TXT”. If the file “MESSAGE.TXT” content is as follows: (2)

I like people like you who like others like me and make others like me to like others like you

The output of the function should be :

Count of you/me in file : 4

c) Write a function in C++ to search for a laptop from a binary file "LAPTOP.DAT" containing the objects of class LAPTOP (as defined below). The user should enter the Model No and the function should search and display the details of the laptop. If the Model No is not matching the function should display "Not Found". (3)

```

class LAPTOP
{
long ModelNo ;
float RAM, HDD ;
char Details [120] ;
public:
void StockEnter ( )
{
cin>>ModelNo>>RAM>>HDD;
gets (Details);
}
void StockDisplay ( )
{
cout<<ModelNo<<RAM<<HDD<<Details<<endl;
}
long ReturnModelNo ( )
{
return ModelNo ;
}
};

```

SECTION – B (Python)

SECTION – C

5. a) Explain the concept of Intersection operation between two tables, with the help of an appropriate example. (2)

NOTE: Answer the questions (b) and (c) on the basis of the following tables CAR and PRICE

Table : CAR

Model	Size of engine	Registration
Vectra	1.8	VSE 648
Zafira	2.0	BFK 297
Golf	1.4	SB A5526
Polo	1.2	DD B4978
Jetta	1.6	B G8347
Megane	1.4	1233 CD 33
Clio	1.2	6289 XF 54

Table: PRICE

Registration	Make	Amount
VSE 648	Opel	19000
BFK 297	Opel	29000
SB A5526	Volkswagen	15000
DD B4978	Volkswagen	11000
B G8347	Volkswagen	19000
1233 CD 33	Renault	17000
6289 XF 54	Renault	11000

b) Write SQL Queries: (4)

- i. To display Model, Size of engine and Amount of all cars.
- ii. To display Registration and Make of all cars whose Amount is in between 18000 and 23000.
- iii. To display all car details from CAR table in the ascending order of Model
- iv. To display the maximum and minimum Amount of every Make group.

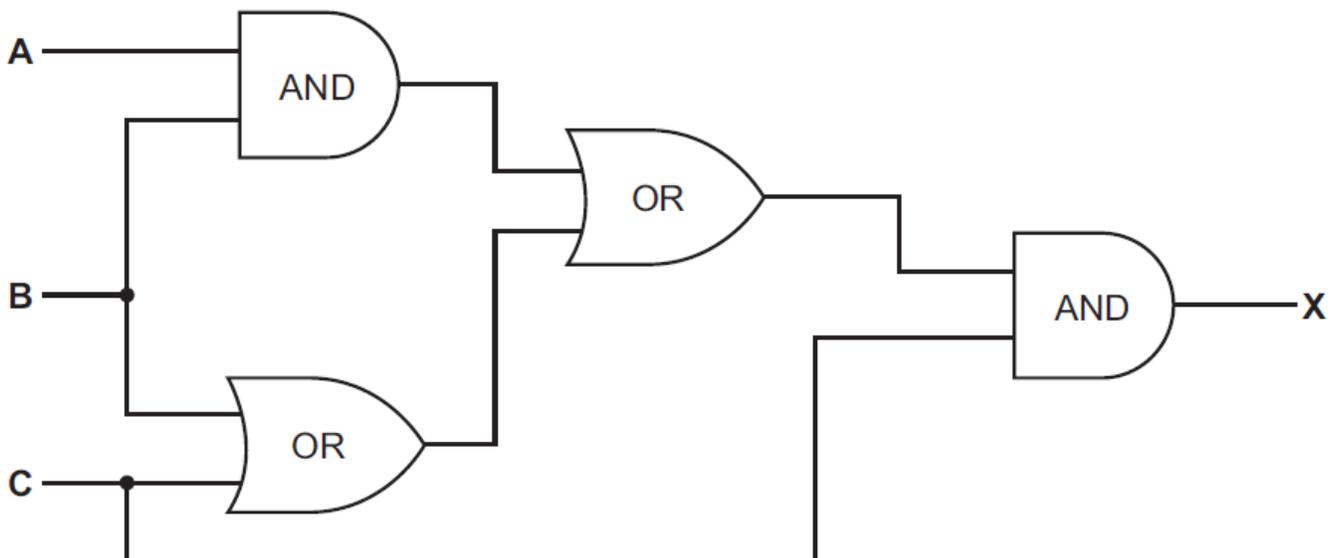
c) Write the output of the following SQL commands: (2)

- i. SELECT COUNT(*), COUNT(DISTINCT Make) from PRICE;
- ii. SELECT Model from CAR where Size of engine>1.5 ORDER BY Model DESC.
- iii. SELECT Make, COUNT(*) from PRICE WHERE Amount<20000 GROUP BY Make;
- iv. SELECT Model, Size of engine from CAR WHERE Registration NOT IN ('B G8347', 'SB A5526');

6. a) Name the law shown below and verify it algebraically. (2)

$$X + YZ = (X + Y)(X + Z)$$

b) Complete the truth table for the logic circuit: (2)



A	B	C	X
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

c) Write the POS expression form of the function F(X,Y) for the following truth table representation of F: (1)

X	Y	F
0	0	1
0	1	0
1	0	1
1	1	0

d) Obtain the minimal form for the following Boolean expression using Karnaugh Map: (3)

$$F(P,Q,R,S) = \sum (1, 3, 4, 5, 6, 7, 12, 13)$$

7. a) Expand the following: (1)

- IMAP
- SIM

b) Complete each sentence below using one item from the list. (1)

A bridge A hub
A proxy server A switch

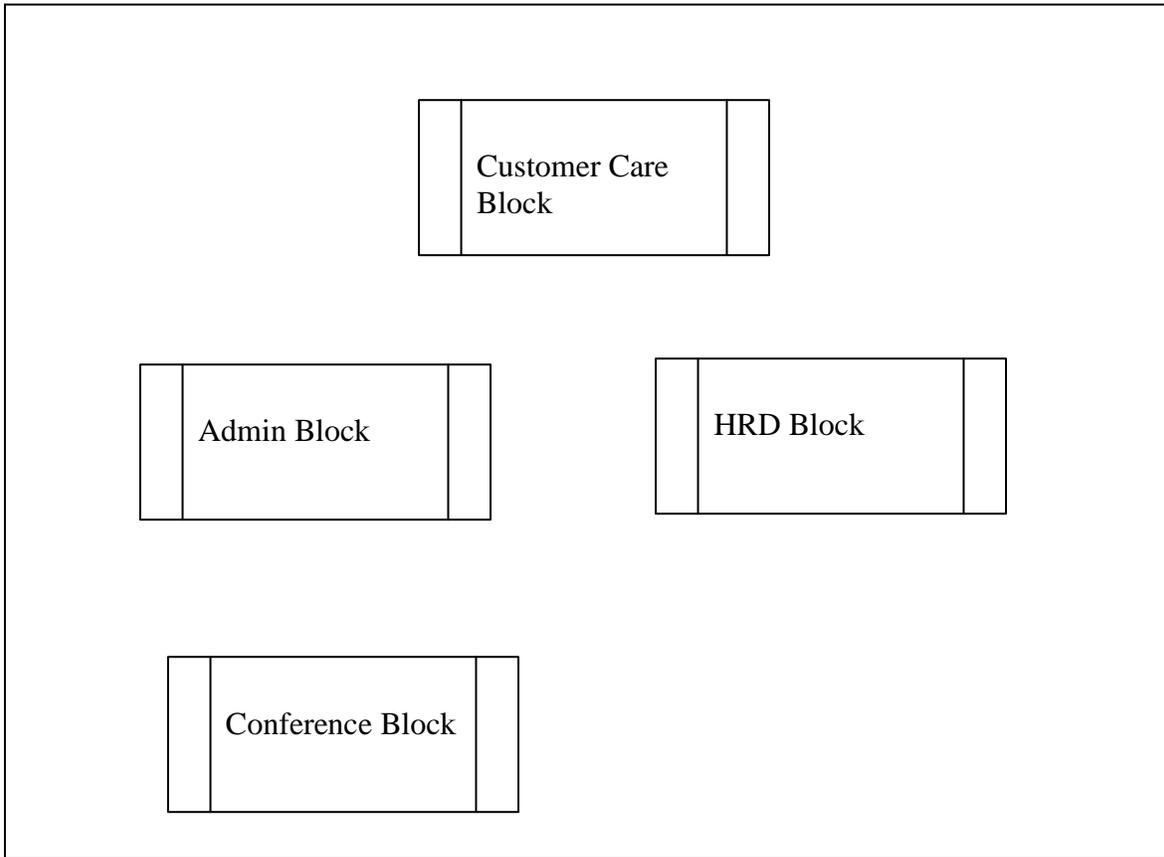
- (i) _____ does not manage any of the data traffic through it.
(ii) _____ forwards data packets to computers and printers.
(iii) _____ can be a major component of a firewall.
(iv) _____ usually only has two ports.

c) In online banking data can be misused by hackers. Name three types of security measure which can be used to help to prevent this. (1)

d) Mobile telephones (cellphones) are used for accessing the internet. Give one advantage and one disadvantages of using a mobile telephone rather than using a laptop computer to access the internet. (1)

e) InterAYR is a London based travel company owned by Angela Yelena Reith. The company is planning to open a new office in Delhi. As a network advisor, you have to understand their requirement and suggest them the best available solution. Their queries are mentioned as (i) to (iv) below:

The physical locations of the buildings of InterAYR



Block to Block distance (in Mtrs.)

Block (From)	Block (To)	Distance
Customer Care	Admin	25
Customer Care	HRD	25
Admin	Conference	35
HRD	Conference	75

Expected Number of Computers to be installed in each block

Block	Computers
Customer Care	10
Admin	25
HRD	15
Conference	5

- i) Admin block has to be used for critical operations. They want their computers to get maximum bandwidth. Suggest a suitable network device for this. (1)
- ii) What is the most appropriate block, where InterAYR plan to install their server? (1)

- iii) Draw a block to block cable layout to connect all the buildings in the most appropriate manner for efficient communication. (1)
- iv) Suggest a most appropriate communication medium to connect the Delhi office with its US office.(1)

- f) State the differences between Open Source Software and Free Software. (1)

- g) State the differences between Cloud storage and Cloud computing. (1)