



DELHI PUBLIC SCHOOL, RANCHI
PRE BOARD –I EXAMINATION 2017-18
Computer Science (083)

Time: 3 Hours

Class: XII

Maximum Marks: 70

1. (a) What do you mean by data encapsulation? How is it implemented? [2]
(b) Name the header file which include the following C++ functions: [2]
(i) abs() (ii) setw() (iii) ceil() (iv) exit()
(c) Rewrite the following C++ program code after removing the syntax error(s)(if any). Underline each correction. [2]
include <iostream.h>
class BUS
{long BusNo;
char Description[25];
public
void Entry ()
{cin >>BusNo; gets(Description);}
void Display ()
{cout<<BusNo<<" "<<Description<<endl;};}
void main()
{BUS T;
Entry. T(); Display. T();}
- (d) Find the output of the following program (Assume all required header file) : [2]
int g=20;
void func(int &x, int y)
{
x = x - y;
y = x * 10;
cout<< x << ','<<y<<endl;
}
void main()
{ int g = 7;
func(g, ::g);
cout<<g<< ','<<::g<<endl;
func(::g,g);
cout<<g<< ','<<::g<<endl;
}
- (e) Find the output of the following program (Assume all required header file): [2]
char *s = "Polymorphism";
int L = strlen(s);
for (int C = 0; C<L; C++)
{
if (islower(s[C]))
s[C] = toupper(s[C]);
else if (C % 2 == 0)
s[C] = 'E';
else
s[C] = tolower(s[C]);
}
cout<<"New message:"<<s;
- (f) The following code is from a game, which generates a set of 4 random numbers. Yallav is playing this game, help him to identify the correct option(s) out of the four choices given below as the possible set of such numbers generated from the program code so that he wins the game. Justify your answer. [2]
#include <iostream.h>
#include <stdlib.h>
const int LOW=15;

```

void main ( )
{randomize( ) ;
int POINT=5, Number;
for (int I=1;I<=4;I++)
{Number=LOW+random(POINT) ;
cout<<Number<<": " ;
POINT--;}}

```

(i) 19:16:15:18:(ii) 14:18:15:16:(iii) 19:16:14:18:(iv) 19:16:15:16:

2. (a) What do you understand by Polymorphism.? Also, give an example in C++ to illustrate the same. . [2]

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

```

class TEST
{int Regno, Max, Min, Score;
public:
TEST() //Function 1
{Regno= 101;Max=100;Min=40;Score=75;}
TEST(int Pregno,int Pscore) //Function 2
{Regno=Pregno;Max=100;Min=40;Score=Pscore;}
~TEST() //Function 3
{cout<<"TEST Over"<<endl;}
void Display() //Function 4
{cout<<Regno<<": "<<Max<<": "<<Min<<endl;
cout<<"[Score]"<<Score<<endl;}};

```

(i) As per Object Oriented Programming, which. concept is illustrated by **Function 1 & Function 2** together?

(ii) What is **Function 3** specifically referred as ? When do you think, **Function 3** will be invoked/called?

(c) Define a class **Train** in C++ with following description: [4]

Private Members

- TrainNo of type integer
- TrainName of type string
- Source of type string
- Dest of type string
- Fare of type float
- A member function GetFare() to assign the following value for Charges.

Dest	Fare
Mumbai	1000
Chennai	2000
Kolkata	2500

Public Members

- A constructor to initialize the data members as TrainNo=0, TrainName = "XXXX", Source = "YYYY", Dest = "ZZZZ" and Fare = 0.
- A function InputData() to allow user to enter the data members values except Fare.
- A function DisplayData() to display all data members and call GetFare() function.

d) Answer the questions (i) to (iv) based on the following: [4]

```

class Shop
{
char Category[10];
char Date_of_manufacturer[10];
char Company[20];
public:
Shop( );
void entershopdetails( );
void showshopdetails( );
};

```

```

class BigShop : public Shop
{
protected:
int tax;
public:
float Price;
BigShop( );
void enterBigdetails( );
void showBigdetails( );
};
class Mall : public BigShop
{
int no_of_floors;
public:
Mall( );
void enterdetails( );
void showdetails( );
};

```

- (i) How many bytes will be required by an object of class Shop and an object of class Mall respectively?
- (ii) Write names of all the member functions accessible from the objects of class Mall.
- (iii) Write names of all the members accessible from member functions of class BigShop.
- (iv) Write names of all the data members, which are accessible from the objects of class Mall.

3. (a) Write a function REASSIGN() in C++, which accepts an array of integer and its size as parameters and divide all those array elements by 5 which are divisible by 5 and multiply other-array elements by 2. [3]

Sample input Data of the array:

A[0]	A[1]	A[2]	A[3]	A[4]
20	12	15	60	32

Content of the array after calling REASSIGN() function

A[0]	A[1]	A[2]	A[3]	A[4]
4	24	3	12	64

(b) An array P[50][60] is stored in the memory along the column with each of the element occupying 2 bytes, find out the memory location for the element P[10][20], if the Base Address of the array is 6800. [3]

(c) Convert the following infix expression into postfix form showing the status of the stack. [2]

$$a + (b * c) + ((d * e) + f)$$

(d) State the difference between static memory allocation and dynamic memory allocation. [2]

(e) Write a function int SKIPSUM(int A[][3], int N,int M) in C++ to find and return the sum of elements from all alternate elements of a two-dimensional array starting from A[0][0]. [2]

Hint:If the following is the content of the array

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

The function SKIPSUM() should add elements A[0][0], A[0][2], A[1][1],A[2][0] and A[2][2].

(f) Evaluate the following postfix notation of expression: Show status of Stack after each operation) [2]

False, True, NOT, OR, True, False, AND, OR

4. (a) Differentiate between get() and getline() function. [1]

(b) Write a function in C++ to count the words “this” and “these” present in a text file “ARTICLE.TXT”. [2]
[Note that the words “this” and “these” are complete words]

(c) Given a binary file PHONE.DAT, containing records of the following structure type: [3]
class Phonlist { char Name[20], Address[30], AreaCode[5], PhoneNo[15];

```
public:
void Register( );
void Show( );
int CheckCode(char AC[ ])
{ return strcmp(AreaCode, "AC"); } };
```

Write a function TRANSFER() in C++, that would copy all those records which are having AreaCode as "DEL" from PHONE.DAT to PHONEBACK.DAT.

5. (a) What do you understand by Primary Key in a table? Give a suitable example to show equi join between two tables. [2]

(b) Consider the following tables STORE and SUPPLIERS and answer (b1) and (b2) parts of this question:

Table: STORE

ItemNo	Item	Scode	Qty	Rate	LastBuy
2005	Sharpener Classic	23	60	8	31-Jun-09
2003	Ball Pen 0.25	22	50	25	01-Feb-10
2002	Gel Pen Premium	21	150	12	24-Feb-10
2006	Gel Pen Classic	21	250	20	11-Mar-09
2001	Eraser Small	22	220	6	19-Jan-09
2004	Eraser Big	22	110	8	02-Dec-09
2009	Ball Pen 0.5	21	180	18	03-Nov-09

Table: SUPPLIERS

Scode	Sname
21	Premium Stationers
23	Soft Plastics
22	Tetra Supply

(b1) Write SQL commands for the following statements: [4]

- (i) To display details of all the items in the Store table in ascending order of Qty.
- (ii) To display ItemNo and Item of those items from Store table whose Rate is more than 15 Rupees.
- (iii) To display the details of those items whose Supplier code (Scode) is 22 or Quantity in Store (Qty) is more than 110 from the table Store.
- (iv) To display Minimum Rate of items for each Supplier individually as per Scode from the table Store.

(b2) Give the output of the following SQL queries: [2]

- (i) SELECT COUNT(DISTINCT Scode) FROM Store;
- (ii) SELECT Rate*Qty FROM Store WHERE ItemNo=2004;
- (iii) SELECT Item,Sname FROM Store S, Suppliers P WHERE S.Scode=P.Scode AND ItemNo=2006;
- (iv) SELECT MAX>LastBuy) FROM Store;

6. (a) Verify the following algebraically. [2]

$$(A'+B')(A+B)=A'.B+A.B'$$

(b) Design a logical circuit diagram for the Boolean expression: $(X' \cdot (Y' + Z))'$ [2]

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

X	Y	Z	H
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

(d) Reduce the following Boolean Expression using K-Map : [3]
 $F(U, V, W, Z) = \sum (3, 5, 7, 10, 11, 13, 15)$

7. (a) What was the role of ARPANET in the Computer Network? [1]

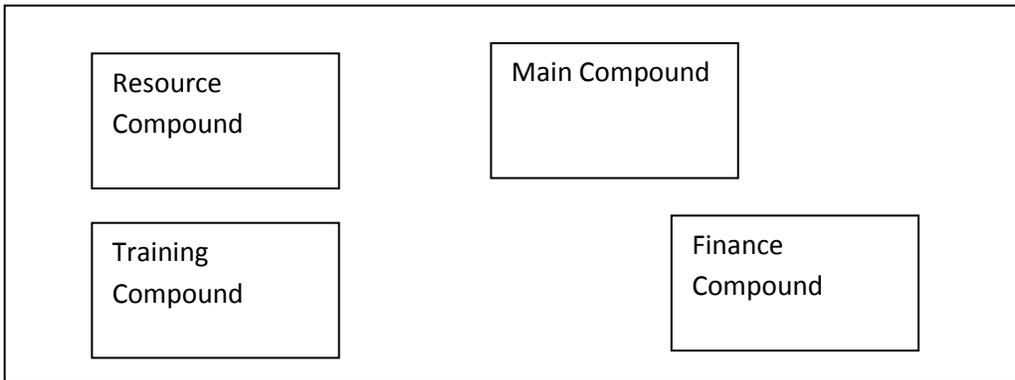
(b) Which of the following is not an unit for data transfer rate? [1]

(i) bps (ii) abps (iii) gbps (iv) kbps

(c) What is the difference between Trojan Horse and Virus in terms of computers? [1]

(d) What term we use for a software/hardware device, which is used to block, unauthorized access while permitting authorized communications. This term is also used for a device or set of devices configured to permit, deny, encrypt, decrypt, or proxy all (in and out) computer traffic between different security domains based upon a set of rules and other criteria. [1]

(e) “Learn Together” is an educational NGO. It is setting up its new campus at Jabalpur for its web based activities. The campus has 4 compounds as shown in the diagram below: [4]



Center to center distances between various Compounds as per architectural drawings (in Metre) is as follows :

Main Compound to Resource Compound	110 m
Main Compound to Training Compound	115 m
Main Compound to Finance Compound	35 m
Resource Compound to Training Compound	25 m
Resource Compound to Finance Compound	135 m
Training Compound to Finance Compound	100 m

Expected Number of Computers in each Compound is as follows :

Main Compound	5
Resource Compound	15
Training Compound	150
Accounts Compound	20

(e1) Suggest a cable layout of connections between the compounds.

(e2) Suggest the most suitable place (i.e. compound) to house the server for this NGO. Also, provide a suitable reason for your suggestion.

(e3) Suggest the placement of the following devices with justification :

(i) Repeater (ii) Hub/Switch

(e4) The NGO is planning to connect its International office situated in Mumbai, which out of the following wired communication link, you will suggest for a very high speed connectivity?

(i) Telephone Analog Line (ii) Optical Fiber (iii) Ethernet Cable

(f) Write the full forms of the following: [1]

(i) GNU (ii) XML

(g) Write one advantage of each for Open Source Software and Proprietary Software. [1]