CBSE Class 12th Computer Science
Outside Delhi Set 4 2017

General Instructions :

1. SECTION A refers to programming language C++.
2. SECTION B refers to programming language Python.
3. SECTION C is compulsory for all.
4. Answer either SECTION A or SECTION B.
5. It is compulsory to mention on the page 1 in the answer book whether you are attempting SECTION A or SECTION B.
6. All questions are compulsory within each section.

SECTION A
[Only for candidates, who opted for C++]

1. (a) Write the type of C++ tokens (keywords and user defined identifiers) from the following: (2)

(i) new (ii) While (iii) case (iv) Num_2

Ans. (i) new - Keyword (ii) While - User defined Identifier

(iii) case - Keyword (iv) Num_2 - User defined Identifier

(b) Anil typed the following C++ code and during compilation he found three errors as follows:

(i) Function strlen should have prototype (ii) Undefined symbol cout

(iii) Undefined symbol endl

On asking, his teacher told him to include necessary header files in the code. Write the names of the header files, which Anil needs to include, for successful compilation and execution of the following code: (1)

```
void main( )
{
char Txt [ ] = "Welcome";
for (int C= 0; C<strlen(Txt); C++)
Txt[C] = Txt[C]+1;
```

cout<<Txt<<endl;

}

Ans. string.h

iostream.h OR fstream.h OR iomanip.h

(c) Rewrite the following C++ code after removing any/all syntactical errors with each correction underlined. (2)

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

void main ( )

{

cout<<"Enter an Alphabet:";

cin>>CH;

switch(CH)

case „A" cout<<"Ant"; Break;

case „B" cout<<"Bear" ; Break;

}

Ans. void main ( )

{

cout<<"Enter an Alphabet:";

char CH; // Error 1

cin>>CH;

switch(CH)

 { // Error 2(i)

case 'A' : // Error 3(i)

cout<<"Ant"; break; // Error 4(i)

case 'B' : // Error 3(ii)

cout<<"Bear"; break; // Error 4(ii)

 } // Error 2(ii)

}

(d) Find and write the output of the following C++ program code: 2

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

#define Diff(N1,N2) ((N1>N2)?N1-N2:N2-N1)

void main ( )

{

```
int A,B, NUM[] = {10,23,14,54,32};
for (int CNT =4; CNT>0; CNT--)
{
A=NUM[CNT];
B=NUM[CNT-1];
cout<<Diff(A,B)<<'#';
}
}
```

Ans. 22#40#9#13#

(e) Find and write the output of the following C++ program code: (3)

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

```
void main ( )
{
int *Point, Score [ ]={100,95,150,75,65,120};
Point = Score;
for (int L = 0; L<6; L++)
{
If ((*Point)%10==0)
*Point /= 2;
else
*Point -= 2;
If ((*Point)%5==0)
*Point /= 5;
Point++;
}
for(int L = 5; L>=0; L--)
cout<<Score[L]<<"*";
}
```

Ans. 12*63*73*15*93*10*

(f) Look at the following C++ code and find the possible output(s) from the options (i) to (iv) following it. Also, write the maximum values that can be assigned to each of the variables N and M. (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 N=random(3),M=random(4);
int DOCK[3][3] = {{1,2,3},{2,3,4},{3,4,5}};
for(int R=0; R<N; R++)
{
for (int C=0; C<M; C++)
cout<<DOCK[R][C]<<" ";
cout<<endl;
}
}
```

(i)	(ii)
1 2 3 2 3 4 3 4 5	1 2 3 2 3 4
(iii)	**(iv)**
1 2 2 3	1 2 2 3 3 4

Ans. Correct Options : (ii) and (iii)

Maximum value of N = 2

Maximum value M = 3

2. (a) Differentiate between protected and private members of a class in context of Object Oriented Programming. Also give a suitable example illustrating accessibility/non-accessibility of each using a class and an object in C++. (2)

Ans.

Private	Protected
Implicit Visibility Mode	Explicit Visibility Mode
Not accessible to member functions of derived class	Accessible to member functions of derived class

Example:

Class A

{

Int X;

protected:

int Y;

public:

void Z ( );

};

OR Any other correct example demonstrating difference between private and protected members of a class

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

Note : Assume all necessary files are included.

class TEST

{

long TCode;

char TTitle[20];

float Score;

public:

TEST() //Member Function 1

{

TCode=100;strcpy(TTitle,"FIRST Test");Score=0;

}

TEST(TEST &T) //Member Function 2

{

TCode=E.TCode+1;

strcpy(TTitle,T.TTitle);

Score=T.Score;

```
}
};
void main ( )
{
_____  //Statement 1
_____  //Statement 2
}
```

(i) Which Object Oriented Programming feature is illustrated by the Member Function 1 and the Member Function 2 together in the class TEST? (1)

Ans. Polymorphism OR Constructor overloading OR Function Overloading

(ii) Write Statement 1 and Statement 2 to execute Member Function 1 and Member Function 2 respectively. (1)

Ans. TEST T1;

TEST T2(T1); //Statement 2

OR

TEST T2=T1; //Statement 2

(c) Write the definition of a class BOX in C++ with the following description: (4)

Private Members

- Box Number // data member of integer type

- Side // data member of float type

- Area // data member of float type

- Exec Area ( ) // Member function to calculate and assign

// Area as Side * Side

Public Members

- GetBox ( ) // A function to allow user to enter values of

// BoxNumber and Side. Also, this

// function should call Exec Area ( ) to calculate

// Area

- ShowBox ( ) // A function to display Box Number, Side

// and Area

Ans. class BOX

```
{
int  BoxN mber ;
```

```
float Side ;

float Area ;

void Exec Area ( ){ Area=Side*Side;}

public:

void GetBox ( );

void ShowBox ( );

};

void BOX::Get Box ()

{

cin>>BoxNumber>>Side;

Exec Area ( );

}

void BOX::ShowBox ( )

{

cout<<BoxNumber<<" "<<Side<<" "<<Area<<endl;
```

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

```
class First

{

int X1;

protected:

float X2;

public:

First ( );

void Enter1 ( ); void Display1( );

};

class Second: private First

{

int Y1;

protected:

float Y2;

public:

Second ( );

void Enter2 ( );
```

```
void Display ( );
};
class Third : public Second
{
int Z1;
public:
Third();
void Enter3();
void Display();
};
void main()
{
Third T; //Statement 1
_____;//Statement 2
}
```

(i) Which type of Inheritance out of the following is illustrated in the above example? Single Level Inheritance, Multilevel Inheritance, Multiple Inheritance

Ans. Multilevel Inheritance

(ii) Write the names of all the member functions, which are directly accessible by the object T of class Third as declared in main ( ) function.

Ans. Enter2( ), Display( ) of class Second

Enter3( ), Display( ) of class Third

OR

Enter2( )

Second::Display( )

Enter3( )

Display( ) OR Third::Display( )

(iii) Write Statement 2 to call function Display ( ) of class Second from the object T of class Third.

Ans. T.Second: :Display ( );

(iv) What will be the order of execution of the constructors, when the object T of class Third is declared inside main ( )?

Ans. First, Second, Third

3. (a) Write the definition of a function AddUp(int Arr[], int N) in C++, in which all even positions (i.e., 0,2,4,...) of the array should be added with the content of the element in the next position and odd positions (i.e., 1,3,5,...) elements should be incremented by 10. (3)

Example: if the array Arr contains

23	30	45	10	15	25

Then the array should become

53	40	55	20	40	35

Note :

- The function should only alter the content in the same array.
- The function should not copy the altered content in another array.
- The function should not display the altered content of the array.
- Assuming, the Number of elements in the array are Even.

Ans. void AddUp(int Arr[], int N)

```
{
for(int i=0; i<N; i++)
{
if(i%2==0)
Arr[i]=Arr[i]+Arr[i+1];
else
Arr[i]=Arr[i]+10;
}
}
```

OR

Any other correct C++ code for the required function definition.

(b) Write a definition for a function SUMMIDCOL(int MATRIX[][10], int N,int M) in C++, which finds the sum of the middle column‖s elements of the MATRIX (Assuming N represents number of rows and M represents number of columns, which is an odd integer). (2)

Example : If the content of array MATRIX having N as 5 and M as 3 is as follows:

1	2	1
2	1	4
3	4	5
4	5	3
5	3	2

The function should calculate the sum and display the following : Sum of Middle Column: 15

Ans. void SUMMIDCOL(int MATRIX[][10],int N,int M)

{

int mid=M/2;

int sum=0;

for(int i=0; i<N; i++)

{

sum=sum+MATRIX[i][mid];

} c

out<<" Sum of Middle Column"<<sum;

} O

R

Any other correct C++ code for the required function definition

(c) ARR[15][20] is a two-dimensional array, which is stored in the memory along the row with each of its elements occupying 4 bytes.

Find the address of the element ARR[5][15], if the element ARR[10][5] is stored at the memory location 35000. (3)

Ans. ROW MAJOR:

Loc(ARR[I][J]) =BaseAddress + W [(I – LBR)*C + (J – LBC)]

(where W=size of each element = 4 bytes, R=Number of

Rows=15, C=Number of Columns=20)

Assuming LBR = LBC = 0

LOC(ARR[10][5])

35000 = BaseAddress + W(I*C + J)

35000 = BaseAddress + 4(10*20 + 5)

35000 = BaseAddress + 4(205)

35000 = BaseAddress + 820

BaseAddress = 35000 - 820

= 34180

LOC(ARR[5][15])= BaseAddress + W(I*C + J)

= 34180 + 4(5*20 + 15)

= 34180 + 4(100 + 15)

= 34180 + 4 x 115

= 34180 + 460

= 34640

OR Loc(ARR[I][J]) = Ref. Address + W ((I – LR)*C + (J – LC))

(where W=size of each element = 4 bytes,

R=Number of Rows =15, C=Number of Columns=20

Reference Address= Address of given cell ARR[10][5]=35000

LR = Row value of given cell = 10

LC = Column value of given cell = 5

LOC(ARR[5][15]) = LOC(ARR[10][5]) + 4((5-10)*20 + (15-5))

LOC(ARR[5][15]) = 35000 + 4(-100 + 10)

= 35000 + 4[-90]

= 35000 -360

= 34640

(d) Write the definition of a member function PUSHGIFT() for a class STACK in C++, to add a GIFT in a dynamically allocated stack of GIFTs considering the following code is already written as a part of the program : (4)

struct GIFT

{

int GCODE; //Gift Code

char GDESC[20]; //Gift Description

GIFT *Link;

};

class STACK

{

Gift *TOP;

public:

STACK(){TOP=NULL;}

void PUSHGIFT ( );

void POPGIFT ( );

~STACK ( );

};

Ans. void STACK::PUSHGIFT ( )

{

GIFT *T = new GIFT;

cin>>T->GCODE;

gets(T->GDESC);

T->Link = TOP;

TOP = T;

}

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

X – (Y + Z) / U * V

Ans.

ELEMENT	Stack	POSTFIX
X		X
-	-	X
(	-(	X
Y	-(	XY
+	-(+	XY
Z	-(+	XYZ
)	-	XYZ+
/	-/	XYZ+
U	-/	XYZ+U

*	-*	XYZ+U/
V	-*	XYZ+U/V
		XYZ+U/V*-

OR

X-(Y+A)/U*V = (X-(((Y+Z)/U) *V))

ELEMENT	Stack	POSTFIX
(		
X		X
-	-	
(		
(		
(		
Y		XY
+	-+	
Z		XYZ
)	-	XYZ+
/	-/	
U		XYZ+U
)	-	XYZ+U/
*	-*	
V		XYZ+U/V
)		XYZ+U/V*
)		XYZ+U/V*-

Postfix= XYZ+U/V*-

OR Any other method for converting the given infix expression to its equivalent postfix

expression showing stack contents.

4. (a) Polina Raj has used a text editing software to type some text in an article. After saving the article as MYNOTES.TXT, she realised that she has wrongly typed alphabet K in place of alphabet C everywhere in the article.

Write a function definition for PURETEXT ( ) in C++ that would display the corrected version of the entire article of the file MYNOTES.TXT with all the alphabets ——K‖‖ to be displayed as an alphabet "c" on screen. (3)

Note : Assuming that MYNOTES.TXT does not contain any C alphabet otherwise.

Example :

If Polina has stored the following content in the file MYNOTES.TXT:

> OWN A KUTE LITTLE KAR.
> I KARE FOR IT AS MY KHILD

The function PURETEXT() should display the following content:

> I OWN A CUTE LITTLE CAR.
> I CARE FOR IT AS MY CHILD.

Ans. void PURETEXT ( )

{

char ch;

ifstream F("MYNOTES.TXT");

```
OR
fstream F;
F.open("MYNOTES.TXT", ios::in);
OR
fstream F("MYNOTES.TXT", ios::in);
```

while(F. get(ch))

{

if(ch=='K')

ch='C';

cout<<ch;

}

F.close ( ); //IGNORE

}

OR

Any other correct function definition

(b) Write a definition for function COUNTPICS( ) in C++ to read each object of a binary file PHOTOS.DAT, find and display the total number of PHOTOS of type PORTRAIT. Assume that the file PHOTOS.DAT is created with the help of objects of class PHOTOS, which is defined below: (2)

class PHOTOS

{

int PCODE;

char PTYPE[20];//Photo Type as "PORTRAIT","NATURE"

public:

void ENTER()

{

cin>>PCODE;gets(PTYPE);

}

void SHOWCASE()

{

cout<<PCODE<<":" <<PTYPE<<endl;

}

char *GETPTYPE(){return PTYPE;}

};

Ans. void COUNTPICS()

{

ifstream F;

F.open ("PHOTOS.DAT",

ios::binary);

int count=0;

PHOTOS obj;

while(F.read((char*)&obj,

sizeof(obj)))

{

if(strcmp(obj. GETPTYPE(),"PORTRAIT")==0)

count++;

} c

out<<"Number of PORTRAIT photos :"<<count;

F.close ( ); //IGNORE

}

OR Any other correct function definition

(c) Find the output of the following C++ code considering that the binary file

CLIENTS.DAT exists on the hard disk with a data of 200 clients : (1)

class CLIENTS

{

int CCode; char CName[20];

public:

void REGISTER ( ); void DISPLAY();

};

void main ( )

{

fstream File;

File.open("CLIENTS.DAT",ios::binary|ios::in);

CLIENTS C;

File.seekg(6*sizeof(C));

File.read((char*)&C, sizeof(C));

cout<<"Client Number:"<<File.tellg()/sizeof(C) + 1;

File.seekg(0,ios::end);

cout<<" of "<<File.tellg()/sizeof(C)<<endl;

File.close();

}

Ans. Client Number 8 of 200

SECTION B

[Only for candidates, who opted for Python]

1. (a) Which of the following can be used as valid variable identifier(s) in Python? (2)

(i) 4thSum (ii) Total (iii) Number# (iv) _Data

Ans. ii) Total iv) _Data

(b) Name the Python Library modules which need to be imported to invoke the following functions: (1)

(i) floor ( ) (ii) randint ( )

Ans. math

random

(c) Rewrite the following code in Python after removing all syntax error(s). Underline each correction done in the code. (2)

STRING=""WELCOME

NOTE""

for S in range[0,8]:

print STRING(S)

print S+STRING

Ans. STRING= "WELCOME"

NOTE=""

for S in range (0,8) :

print STRING [S]

print S,STRING

Also range(0,8) will give a runtime error as the index is out of range. It should be range(0,7)

(d) Find and write the output of the following Python code: (2)

TXT = ["20","50","30","40"]

CNT = 3

TOTAL = 0

for C in [7,5,4,6]:

T = TXT[CNT]

TOTAL = float (T) + C

print TOTAL

CNT-=1

Ans. 47.0

35.0

54.0

26.0

(e) Find and write the output of the following Python code: (3)

```
class INVENTORY:
def __init__(self,C=101,N="Pad",Q=100): #constructor
self.Code=C
self.IName=N
self.Qty=int(Q);
def Procure(self,Q):
self.Qty = self.Qty + Q
def Issue(self,Q):
self.Qty -= Q
def Status(self):
print self.Code,":",self.IName,"#",self.Qty
I1=INVENTORY ( )
I2=INVENTORY(105,"Thumb Pin",50)
I3=INVENTORY(102,"U Clip")
I1.Procure(25)
I2.Issue(15)
I3.Procure(50)
I1.Status ( )
I3.Status ( )
I2.Status ( )
```

Ans. Output

101 : Pad # 125

102 : U Clip # 150

105 : Thumb Pin # 35

(f) What are the possible outcome(s) executed from the following code? Also specify the maximum and minimum values that can be assigned to the variable N. (2)

```
import random
NAV = ["LEFT","FRONT","RIGHT","BACK"];
NUM = random.randint(1,3)
NAVG = ""
for C in range (NUM,1,-1):
NAVG = NAVG+NAV[I]
print NAVG
```

i) BACKRIGHT	(ii) BACKRIGHTFRONT
(iii) BACK	(iv) LEFTFRONTRIGHT

Ans. (i) BACKRIGHT

Max value 3 and minimum value 1 for variable NUM

OR

I or N not defined

OR

; wrongly placed in line 2

2. (a) List four characteristics of Object Oriented Programming. (2)

Ans. - Encapsulation

- Data Hiding

- Abstraction

- Inheritance

- Polymorphism

(b) class Exam: (2)

Regno=1

Marks=75

def __init__(self, r, m): #function 1

self. Regno=r

self. Marks=m91 14

def Assign (self, r, m): #function 2

Regno = r

Marks = m

def Check(self): #function 3

print self. Regno, self. Marks

print Regno, Marks

(i) In the above class definition, both the functions — function 1 as well as function 2 have similar definition. How are they different in execution ?

(ii) Write statements to execute function 1 and function 2.

Ans. (i) Function 1 is the constructor which gets executed automatically as soon as the object of the class is created. Function 2 is a member function which has to be called to assign the values to Regno and Marks.

(ii) Function 1 E1=Exam(1,95) # Any values in the parameter

Function 2 E1.Assign(1,95) # Any values in the parameter

(c) Define a class BOX in Python with the following specifications: (4)

Instance Attributes

- BoxID # Numeric value with a default value 101

- Side # Numeric value with a default value 10

- Area # Numeric value with a default value 0

Methods :

- ExecArea ( ) # Method to calculate Area as

Side * Side

- NewBox ( ) # Method to allow user to enter values of

BoxID and Side. It should also

Call ExecArea Method

- ViewBox ( ) # Method to display all the Attributes

Ans. class BOX: # can also be given as class BOX ( ):

or class BOX(Object):

```
Def_init_(self, B, S, A):
#Any variable instead of B, S, A, may be used
Self.Box=B
Self.Side=S
Self.Side=A
```

def __init__(self):

self.BoxID=101

self.Side=10

self.Area=0

def ExecArea(self):

self.Area=self.Side*self.Side

def NewBox(self):

self.BoxID=input("Enter BoxID")

self.Side=input("Enter side")

self.ExecArea ( ) # OR ExecArea(self)

def viewBox (self):

print self.BoxID

print self.Side

print self.Area

(d) Differentiate between static and dynamic binding in Python ? Give suitable examples of each. (2)

Ans. Static Binding: It allows linking of function call to the function definition during compilation of the program.

Dynamic Binding: It allows linking of a function during run time. That means the code of the function that is to be linked with function call is unknown until it is executed. Dynamic binding of functions makes the programs more flexible.

(e) Write two methods in Python using the concept of Function Overloading (Polymorphism) to perform the following operations: (2)

(i) A function having one argument as Radius, to calculate Area of Circle as 3.14*Radius*Radius.

(ii) A function having two arguments as Base and Height, to calculate Area of right-angled triangle as 0.5*Base* Height.

Ans. def Area(R):

print 3.14*R*R

def Area(B,H):

print 0.5*B*H

Note: Python does not support function overloading " as illustrated in the example shown above ". If you run the code, the second Area(B,H) definition will overide the first one.

3. (a) What will be the status of the following list after the First, Second and Third pass of the bubble sort method used for arranging the following elements in ascending order ? (3)

Note : Show the status of all the elements after each pass very clearly underlining the changes.

52, 42, –10, 60, 90, 20

Ans. I Pass

52	42	-10	60	90	20
42	52	-10	60	90	20

42	-10	52	60	90	20
42	-10	52	60	90	20
42	-10	52	60	90	20
42	-10	52	60	20	90

II Pass

42	-10	52	60	20	90
-10	42	52	60	20	90
-10	42	52	60	20	90
-10	42	52	60	20	90
-10	42	52	20	60	90

III Pass

-10	42	52	20	60	90
-10	42	52	20	60	90
-10	42	52	20	60	90
-10	42	20	52	60	90

(b) Write definition of a method EvenSum(NUMBERS) to add those values in the list of NUMBERS, which are odd. (3)

Ans. def EvenSum(NUMBERS):

n=len(NUMBERS)

s=0

for i in range(n):

if (i%2!=0):

s=s+NUMBERS[i]

p

(c) Write Addnew(Member) and Remove(Member) methods in Python to Add a new Member and Remove a Member from a list of Members, considering them to act as

INSERT and DELETE operations of the data structure Queue. (4)

Ans. class queue:

Member= [ ]

def Addnew(self):

a=input("enter member name: ")

queue.Member.append(a)

def Remove(self):

if (queue.Member== [ ]):

print "Queue empty"

else:

print "deleted element is: ",queue.Member[0]

del queue.Member[0] # queue.Member.delete ( )

(d) Write definition of a method MSEARCH(STATES) to display all the state names from a list of STATES, which are starting with alphabet M. (2)

For example :

If the list STATES contains

["MP","UP","WB","TN","MH","MZ","DL","BH","RJ","HR"]

The following should get displayed :

MP

MH

MZ

Ans. def MSEARCH(STATES):

for i in STATES:

if i[0]=='M':

print i

(e) Evaluate the following Postfix notation of expression: (2)

4, 2, *, 22, 5, 6,+,/,-

Ans.

ELEMENT	Stack Contests
4	4
2	4, 2

*	8
22	8, 22
5	8, 22, 5, 6
6	8, 22, 5, 6
+	8, 22, 11
/	8, 2
-	6

Answer: 6

4. (a) Differentiate between file modes r+ and rb+ with respect to Python. (1)

Ans. r+ Opens a file for both reading and writing. The file pointer placed at the beginning of the file.

rb+ Opens a file for both reading and writing in binary format. The file pointer placed at the beginning of the file.

(b) Write a method in Python to read lines from a text file MYNOTES.TXT, and display those lines, which are starting with the alphabet —K‖. (2)

Ans. def display ( ):

file=open('MYNOTES.TXT','r')

line=file.readline ( )

while line:

if line[0]=='K' :

print line

line=file.readline ( )

file.close ( ) #IGNORE

(c) Considering the following definition of class FACTORY, write a method in Python to search and display the content in a pickled file FACTORY.DAT, where FCTID is matching with the value —'105'. (3)

class Factory:

def __in it__(self, FID, FNAM):

self. FCTID = FID # FCTID Factory ID

self. FCTNM = FNAM # FCTNM Factory Name

self. PROD = 1000 # PROD Production

def Display(self):

print self. FCTID,":" self. FCTNM,":", self. PROD

Ans. import pickle

def ques4c ( ):

f=Factory ( )

file=open('FACTORY.DAT','rb')

try:

while True:

f=pickle.load(file)

if f.FCTID==105:

f.Display()

except EOF Error:

pass

file.close ( ) #IGNORE

SECTION C
[For all the candidates]

5. (a) Observe the following table MEMBER carefully and write the name of the RDBMS operation out of (i) SELECTION (ii) PROJECTION (iii) UNION (iv) CARTESIAN PRODUCT, which has been used to produce the output as shown in RESULT. Also, find the Degree and

Cardinality of the RESULT: (2)

	MEMBER	
NO	MNAME	STREAM
M001	JAYA	SCIENCE
M002	ADITYA	HUMANITIES
M003	HANSRAJ	SCIENCE
M004	SHIVAK	COMMERCE

RESULT

NO	MNAME	STREAM
M002	ADITYA	HUMANITIES

Ans. (i) SELECTION

Degree=3

Cardinality=1

(b) Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables. (6)

DVD

	DVD	
DCODE	**DTITLE**	**DTYPE**
F101	**Henry Martin**	**Folk**
C102	**Dhrupad**	**Classical**
C101	**The Planets**	**Classical**
F102	**Universal Soldier**	**Folk**
R102	**A day in life**	**Rock**

	MEMBER		
MID	NAME	DCODE	ISSUEDATE
101	AGAM SINGH	R102	2017-11-30
103	ARTH JOSEPH	F102	2016-12-13
102	**NISHA HANS**	**C101**	**2017-07-24**

(i) To display all details from the table MEMBER in descending order of ISSUEDATE.

Ans. SELECT * FROM MEMBER ORDER BY ISSUEDATE DESC;

(ii) To display the DCODE and DTITLE of all Folk Type DVDs from the table DVD.

Ans. SELECT DCODE,DTITLE FROM DVD WHERE DTYPE='Folk';

(iii) To display the DTYPE and number of DVDs in each DTYPE from the table DVD.

Ans. SELECT COUNT(*),DTYPE FROM DVD GROUP BY DTYPE;

(iv) To display all NAME and ISSUEDATE of those members from the table MEMBER

who have DVDs issued (i.e., ISSUEDATE) in the year 2017.

Ans. SELECT NAME, ISSUEDATE FROM MEMBER WHERE

ISSUEDATE>='2017-01-01' AND ISSUEDATE<='2017-12-31';

OR SELECT NAME, ISSUEDATE FROM MEMBER WHERE ISSUEDATE

BETWEEN '2017-01-01' AND '2017-12-31';

OR SELECT NAME, ISSUEDATE FROM MEMBER WHERE ISSUEDATE LIKE

'2017%';

(v) SELECT MIN(ISSUEDATE) FROM MEMBER;

Ans. MIN(ISSUEDATE)

2016-12-13

(vi) SELECT DISTINCT DTYPE FROM DVD;

Ans. DISTINCT DTYPE

Folk

Classical

Rock

(vii) SELECT D.DCODE, NAME, DTITLE

FROM DVD D, MEMBER M WHERE D.DCODE=M.DCODE;

Ans.

DCODE	NAME	DTITLE
R102	AGAM SINGH	A Day in Life
R102	ARTH JOSEPH	Universal Soldier
C101	NISHA HANS	The Planets

(viii) SELECT DTITLE FROM DVD

WHERE DTYPE NOT IN ("Folk", "Classical");

Ans. DTITle

A day in life

6. (a) State DeMorgan‖s Laws of Boolean Algebra and verify them using truth table. (2)

Ans. (i) (A.B)'=A'+B' (ii) (A+B)'=A'.B'

Truth Table Verification:

(i)

A	B	A.B	(A.B)'	A'	B'	A'+B'
0	0	0	1	1	1	1
0	1	0	1	1	0	1
1	0	0	1	0	1	1
1	1	1	0	0	0	0

(ii)

A	B	A+B	(A+B)'	A'	B'	A'.B'
0	0	0	1	1	1	1
0	1	1	0	1	0	0
1	0	1	0	0	1	0
1	1	1	0	0	0	0

(b) Draw the Logic Circuit of following Boolean Expression using only NOR Gates: (2)

(A+B).(C+D)

Ans.
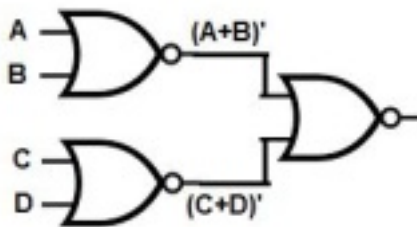
(c) Derive a Canonical POS expression for a Boolean function G, represented by the following truth table: (1)

X	Y	Z	G(X,Y,Z)
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	1

| 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 |

Ans. G(X,Y,Z)= (X+Y+Z).(X+Y+Z').(X+Y'+Z').(X'+Y'+Z)

OR G(X,Y,Z)= ∏ (0,1,3,6)

(d) Reduce the following Boolean Expression to its simplest form using K-Map: (3)

E (U , V , Z , W) = (2 , 3 , 6 , 8 , 9 , 10 , 11 , 12 , 13)

Ans.

	U'V'	U'V	UV	UV'
Z'W'			1	1
Z'W			1	1
ZW	1			1
ZW'	1	1		1

OR

	Z'W'	Z'W	ZW	ZW'
U'V'			1	1
U'V				1
UV	1	1		
UV'	1	1	1	1

E(U,V,Z,W)=UZ'+V'Z+U'ZW'

7. (a) Differentiate between communication using Optical Fiber and Ethernet Cable in context of wired medium of communication technologies. (2)

Ans. - Optical Fibre

- Very Fast - Expensive - Immune to electromagnetic interference

Ethernet Cable -

- Slower as compared to Optical Fiber - Less Expensive as compared to Optical Fiber

- prone to electromagnetic interference

(b) Janish Khanna used a pen drive to copy files from his friend‖s laptop to his office computer. Soon his computer started abnormal functioning. Sometimes it would

restart by itself and sometimes it would stop different applications running on it. **Which of the following options out of (i) to (iv), would have caused the malfunctioning of the computer ? Justify the reason for your chosen option: (2)**

(i) Computer Virus (ii) Spam Mail (iii) Computer Bacteria (iv) Trojan Horse

Ans. (i) Computer Virus

OR (iv) Trojan Horse

Justification:

- Pen drive containing Computer Virus / Trojan Horse was used before the abnormal functioning started, which might have corrupted the system files. - Computer Virus/ Trojan Horse affects the system files and start abnormal functioning in the computer

(c) Ms. Raveena Sen is an IT expert and a freelancer. She recently used her skills to access the Admin password for the network server of Super Dooper Technology Ltd. and provided confidential data of the organization to its CEO, informing him about the vulnerability of their network security. Out of the following options (i) to (iv), which one most appropriately defines Ms. Sen? (2) Justify the reason for your chosen option: (i) Hacker (ii) Cracker (iii) Operator (iv) Network Admin

Ans. (i) Hacker - A Hacker is a person who breaks into the network of an organization without any malicious intent.

(d) Hi Standard Tech Training Ltd. is a Mumbai based organization which is expanding its office set-up to Chennai. At Chennai office compound, they are planning to have 3 different blocks for Admin, Training and Accounts related activities. Each block has a number of computers, which are required to be connected in a network for communication, data and resource sharing.

As a network consultant, you have to suggest the best network related solutions for them for issues/problems raised by them in (i) to (iv), as per the distances between various blocks/locations and other given parameters.
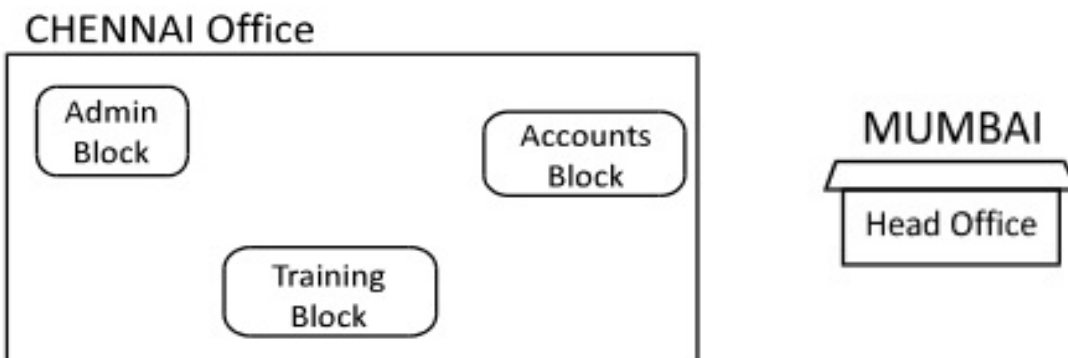
Shortest distances between various blocks/locations:

Admin Block to Accounts Block	300 Metres
Accounts Block to Training Block	150 Metres
Admin Block to Training Block	200 Metres
MUMBAI Head Office to CHENNAI Office	1300 Km

(i) Suggest the most appropriate block/location to house the SERVER in the CHENNAI office (out of the 3 blocks) to get the best and effective connectivity. Justify your answer. (1)

Ans. Training Block - Because it has maximum number of computers.

(ii) Suggest the best wired medium and draw the cable layout (Block to Block) to efficiently connect various blocks within the CHENNAI office compound. (1)

Ans. Best wired medium: Optical Fibre OR CAT5 OR CAT6 OR CAT7 OR CAT8 OR Ethernet Cable
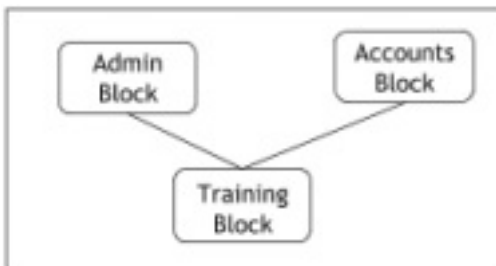
(iii) Suggest a device/software and its placement that would provide data security for the entire network of the CHENNAI office. (1)

Ans. Firewall - Placed with the server at the Training Block OR Any other valid device/ software name

(iv) Suggest a device and the protocol that shall be needed to provide wireless Internet access to all smartphone/laptop users in the CHENNAI office. (1)

Ans. Device Name: WiFi Router OR WiMax OR RF Router OR Wireless Modem OR RF Transmitter