

**Q1.** What is the difference between *call by reference* & *call by value* method in a user-defined function in C++? Explain it with suitable example.

**Q.2.** Write the names of the *header files*, which is/are essentially, required to execute the following functions:

**Q .3.** Rewrite the following program after removing all the syntactical errors (if any), underlining each correction.

```
include<iostream.h>
typedef char[40] string;
void main( )
{ string S="Australia";
L=strlen(S);
```

**Q 4.** Give the *output* of the following program ( Assuming that all required header files are included in the program ) :

```
#define i 5
class TEMP
{ static int a;
float b;
public:
TEMP( )
{ b=10; }
void INTEMP( )
{ a++;
b=a+10; }
void OUTTEMP( )
{ cout<<a*i<<"$"<<b-3<<endl; } };
int TEMP::a=2;
void main()
{ TEMP ob[5];
for(int x=1;x<5;x++)
ob[x].INTEMP( );
for(x=1;x<5;x++)
ob[x].OUTTEMP( );}
```

**Q . 5.** Give the *output* of the following program ( Assuming that all required header files are included in the program ) :

```
#include<iostream.h>
#include<stdio.h>
#include<conio.h>
void TRANSFER(char *s1,char *s2)
{ intn,j=0;
for(inti=0;*(s1+i)!='\0';i++)
{
n=*(s1+i);
if(n%2==0)
*(s2+j++)=*(s1+i);
} }
void main()
```

```
{ char *p="ChaRlesBabBaGe",q[80];
TRANSFER(p,q);
cout<<q<<endl;}
```

**Q. 6.** Go through the following c++ code, find out the **correct possible output(s)** from the suggested output options i) to iv). Also write the **highest value** which can be assigned to variable G :

```
#include<iostream.h>
#include<stdlib.h>
void main( )
{
randomize( );
int G,H=5;
G=random(H)+30;
for(inti=35;i>G;i--)
cout<<i<<'$';
cout<<i;
}
```

1. 35\$34\$33\$32\$31\$30\$
2. 35\$34\$33\$32\$31
3. 30\$31\$32\$33\$34\$35\$36
4. 35\$34\$33\$32\$31\$30

**Q. 7.** What is **constructor overloading**? Support your answer with example.

**Q. 8 .** Answer the questions (i) and (ii) after going through the following class :

```
class BUS
{ private:
char Pname[30],TicktNo[20];
float Fare;
public:
BUS( ) //function 1
{ strcpy(Pname,"\0");
strcpy(TicktNo,"\0");
Fare=0; }
void Details( ) //function 2
{ cout<<Pname<<endl<<TicktNo<<endl<<Fare<<endl; }
BUS(char * name, char *tno, float N); //function 3
BUS(BUS &F); // function 4
};
```

1. In OOP, what is function 3 referred to as? Also define this function.
2. Define function 4 and write about its purpose?

**Q. 9 .)** Define a class **TAXPAYER** in C++ with following description :

**Private members :**

- a. Name of type string
- b. PanNo of type string
- c. Taxabincm (Taxable income) of type float
- d. TotTax of type double
- e. A function CompTax( ) to calculate tax according to the following slab:

Taxable Income	Tax%
Up to 160000	0
>160000 and <=300000	5
>300000 and <=500000	10
>500000	15

**Public members :**

- A parameterized constructor to initialize all the members
- A function INTAX( ) to enter data for the tax payer and call function CompTax( ) to assign TotTax.
- A function OUTAX( ) to allow user to view the content of all the data members.

**Q. 10** .Answer the questions (1) to (4) based on the following

```

class Student
{ private :
    char Rollno[20], Sname[30];
    protected :
    auto float marks;
public:
    Student( );
    void ENROL( );
    void SHOW( );
};
class Graduate: public Student
{ char Fname[30];
protected:
    unsigned int age;
public:
    Graduate( );
    void GENROL( );
    void GSHOW( );
};
class Pgraduate: private Graduate
{
    char Mname[25];
    signed int year;
public:
    Pgraduate( );
void PGENROL( );
    void PGSHOW( );
};

```

1. Mention the member names that are accessible by an object of Pgraduate class.
2. Name the data members which can be accessed by the objects of Graduate class.
3. Name the data members that can be accessed by the functions of Pgraduate class.
4. How many bytes will be occupied by an object of class Pgraduate?

**Q . 11.** Write a function **TRANSFERP(int ALL[ ], int N)** , to transfer all the prime numbers from a one dimensional array ALL[ ] to another one dimensional array PRIME[ ]. The resultant array PRIME[ ] must be displayed on screen.

**Q. 12.** An array PP[40][32] is stored in the memory along the row with each of the elements occupying 10 bytes. Find out the memory location for the element **PP[18][22]**, if the element PP[7][10] is stored at memory location 5000.

**Q. 13.** Write functions to perform **PUSH & POP** operations in a **dynamically allocated stack** containing the objects of the following structure:

```
struct NODE
```

```

{ char name[30];
  float fees;
  NODE *next; };

```

**Q. 14.** Consider the class:

```

class QUEUE
{
private:
  int data[20],front,rear;
public:
  QUEUE( )
  { front=rear=-1; }
  void INSQ(int d); //to insert an element into queue
  void DELQ( ); //to delete an element from the queue
  void PRINTQ( ); //to print the current status of queue
};

```

Complete the definition of function **DELQ()** of above class.

**Q. 15.** Evaluate the following postfix notation of expression:

**30, 6, 4, +, /, 14, +, 4, \***

**Q. 16.** Observe the program segment given below carefully and answer the question that follows :

```

class school
{ private :
  char name[25];
  int numstu;
public:
  void inschool( );
  void outschool( );
  int retnumstu( )
  { return numstu; }
};
void modify(school A)
{ fstream INOUT;
  INOUT.open("school.dat",ios::binary|ios::in|ios::ate);
  school B;
  int recread=0, found=0;
  while(!found &&INOUT.read((char*)&B,sizeof(B))
  { recread++;
  if(A.retnumstu( )= B.retnumstu( ))
  {
    _____//missing statement
  }
  INOUT.write((char*)&A,sizeof(A));
  Found=1;
  }
  else
  INOUT.write((char*)&B,sizeof(B));
  }
  if(!found)
  cout<<"\nRecord for modification does not exist";
  INOUT.close( );
}

```

If the function **modify( )** is supposed to modify a record in file **school.dat** with the values of school A passed to its argument, write the appropriate statement for missing statement using **seekp( )** or **seekg( )**, whichever needed, in the above code that would write the modified

record at its proper place.

**Q. 17.** Write a function to **count the number of vowels** stored in a text file “**STRINGS.TXT**”.

**Q. 18.** Write a function to **delete** a record on the given **model number** for a **TV** from the binary file “**TV.DAT**” containing the objects of **TV** (as defined below) :

```
class TV
{
long model;
float size;
char brand[30],comp[30];
public:
long retmodel( )
{ return model; }
void Input( ) {cin>>model>>size; gets(brand); gets(comp); }
void Output( ) { cout<<model<<size<<brand<<comp<<endl; } };
```

**Q. 19.** What do you understand by **Primary Key** and **Alternate Key**. Explain with example

**Q.20.** Consider the following table **GAMES** and **PLAYER**. Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to (viii).

**Table : GAMES**

GCODE	GAMENAME	NUMBER	PRZMONEY	SCHDATE
101	Chess	5	25000	23 Jan 2010
102	Badminton	3	38000	12 Nov 2008
103	Carrom	6	18000	18 Mar 2010
105	Table Tennis	3	30000	09 Jan 2009
108	Basketball	5	40000	29 Apr 2009

**Table : PLAYER**

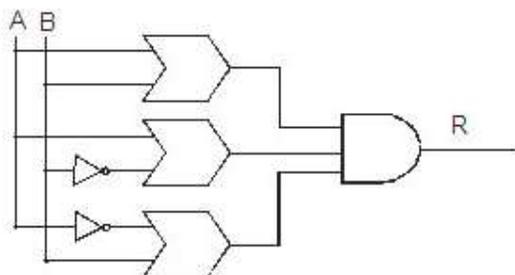
PCODE	NAME	GCODE
1	Rakesh Srivastava	101
2	Nilesh Mishra	102
3	Vandana	108
4	Ravi Jindal	105

1. to display the details of those games which are having prize money less than 30000 and organized before 2009.
2. to display the name of PLAYERS in reverse alphabetical order.
3. to increase the prize money by 1000 for those games which name starts with 'B'.
4. Insert an additional attribute namely DOB for entering date of birth in table PLAYER.
5. SELECT GAMENAME,NAME FROM GAMES G,PLAYER P WHERE G.GCODE=P.GCODE;
6. SELECT MIN(SCHDATE), MAX(PRZMONEY) FROM GAMES ;
7. SELECT AVG(PRZMONEY) FROM GAMES WHERE SCHDATE<'01-JAN-2009';
8. SELECT COUNT(DISTINCT NUMBER) FROM GAMES;
9. **Q. 21.** State and verify **Absorption law** in Boolean algebra.

**Q. 22.** Write the SOP form of a Boolean function G, which is represented in a truth table as follows :

A	B	C	G
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

**Q. 23.** Write the equivalent Boolean Expression R for the following *circuit diagram*:



**Q. 24.** If  $F(P,Q,R,S) = \pi(0,2,4,5,6,7,8,10,11,12,14)$  , obtain the simplified form using *K-Map*.

**Q. 25.** What is the difference between *packet & message* switching?

**Q. 26.** Expand the following terminologies :

i) PHP

ii) SMSC

**Q. 27.** What is infrared technology?

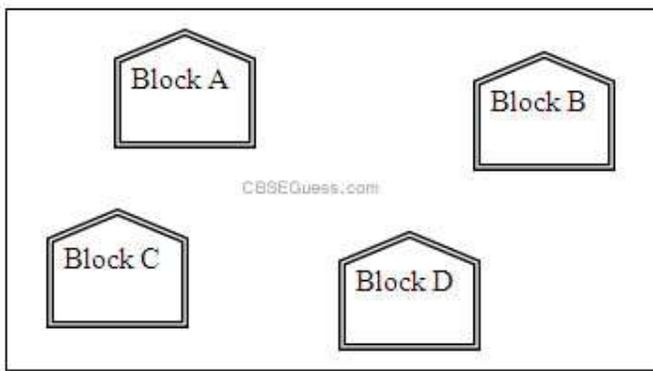
**Q. 28.** What do you mean by *spam*?

**Ans.: SPAM :-** It refers to electronic junk mail or junk newsgroup postings. Some people define it as any unsolicited e-mail.

**Q. 29.** What is *proprietary software*?

**Q. 30.** What is *Web Hosting*?

**Q. 31.** The Rangoli Creation has set up its new center at Patna for its office & web based activities. It has four blocks of buildings as shown in the diagram below:



The distance between various blocks are :

Block A to Block B	30 m
Block B to Block C	110 m
Block C to Block D	55 m
Block A to Block D	260 m
Block B to Block D	195 m
Block A to Block C	32 m

Number of computers in each block are :

Block A	25
Block B	55
Block C	125
Block D	15

( A ) . Suggest the cable layout (with diagram) of connections among the blocks & technology.

( B ) . Suggest the most suitable place to house the server, with a suitable reason.

( C ) . Suggest the placement of the following devices with reasons:

i) Repeater ii) Switch/Hub

( D ) The organization is planning to link its another office in the city located in the hilly region where cable connection is not feasible. Suggest an economic way to connect it with reasonably high speed. Justify your answer.

Q.32. What is the difference between primary key and unique key explain with example?

Q33. Write a C++ code to store employee details into a file name "Details.txt" using linked as data structure.

Q.34. Write a code sort students name in a file name "std\_Info.txt" using bubble sort.

Q.35. A two dimensional array ARR[50][20] is stored in the memory along the row with each of its elements occupying 4 bytes. Find the address of the element RR[30][10], if the element ARR[10][5] is stored at the memory location 15000.

Q.36. R[10][50] is a two dimensional array, which is stored in the memory along the row with each of its element occupying 8 bytes, find the address of the element R[5][15], if the element R[8][10] is stored at the memory location 45000.

Q.37. Write a function PUSHBOOK( ) in C++ to perform insert operation on a Dynamic Stack, which contains Book\_no and Book\_Title. Consider the following definition of NODE, while writing your C++ code.

Q.38. 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:

Q39. Write the definition of a member function DELETE() for a class QUEUE in C++, to remove a product from a dynamically allocated Queue of products considering the following code is already written as a part of the program.

Q.40. Write a user-defined function AddEnd2(int A[][4],int N,int M) in C++ to find and display the sum of all the values, which are ending with 2 (i.e., units place is 2). For example if the content of array is :

22	16	12
19	5	2

The output should be 36.

Q.41. Write a function REVROW(int P[][5],int N, int M) in C++ to display the content of a two dimensional array, with each row content in reverse order. 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:

51 45 56 12 15

63 87 92 91 13

81 46 61 23 81.

Q.42. Write definition for a function DISPMID(int A[][5],int R,int C) in C++ to display the elements of middle row and middle column from a two dimensional array A having R number of rows and C number of columns. For example, if the content of array is as follows:

215 912 516 401 515

103 901 921 802 601

285 209 609 360 172

The function should display the following as output

103 901 921 802 601

516 921 609.

Q.43. Evaluate the following postfix expression. Show the status of stack after execution of each operation separately : T, F, NOT, AND, T, OR, F, AND.

Q.44. Convert the following infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion.  $U * V + R / (S - T)$ .

Q.45. Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion.  $P / (Q - R) * S + T$ .

Q46. Write a definition for function COSTLY() in C++ to read each record of a binary file GIFTS.DAT, find and display those items, which are priced more than 2000. Assume that the file GIFTS.DAT is created with the help of objects of class GIFTS, which is defined below:

```
class GIFTS
{
    int CODE;char ITEM[20];

    float PRICE;

    public:
    void Procure()
    {
        cin>>CODE;
        gets(ITEM);
        cin>>PRICE;
    }

    void View()
    {
        cout<<CODE<<". "<<ITEM<<". "<<PRICE<< endl;
    }

    Float GetPrice(){return PRICE;}
};
```

Q.47. Explain the concept of Cartesian Product between two tables, with the help of appropriate example.

Q.48. 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. Ans Candidate keys :

Code	Item	Qty	Price	Transaction Date
1001	Plastic Folder 14"	100	3400	2014-12-14
1004	Pen Stand Standard	200	4500	2015-01-31
1005	Stapler Mini	250	1200	2015-02-28
1009	Punching Machine Small	200	1400	2015-03-12
1003	Stapler Big	100	1500	2015-02-02

Q.49. Observe the following PARTICIPANTS and EVENTS tables carefully and write the name of the RDBMS operation which will be used to produce the output as shown in RESULT ?Also, find the Degree and Cardinality of the result.

PARTICIPANTS		EVENTS	
PNO	NAME	EVENTCODE	EVENTNAME
1	Aruanabha Tariban	1001	IT Quiz
2	John Fedricks	1002	Group Debate
3	Kanti Desai		

RESULT			
PNO	NAME	EVENTCODE	EVENTNAME
1	Aruanabha Tariban	1001	IT Quiz
1	Aruanabha Tariban	1002	Group Debate
2	John Fedricks	1001	IT Quiz
2	John Fedricks	1002	Group Debate
3	Kanti Desai	1001	IT Quiz
3	Kanti Desai	1002	Group Debate

Q.50. Answer the questions on the basis of the following tables SHOPPE and ACCESSORIES.

**Table : SHOPPE**

Id	SName	Area
S001	ABC Computronics	CP
S002	All Infotech Media	GK II
S003	Tech Shoppe	CP
S004	Geeks Tecno Soft	Nehru Place
S005	Hitech Tech Store	Nehru Place

**Table : ACCESSORIES**

No	Name	Price	Id
A01	Mother Board	12000	S01
A02	Hard Disk	5000	S01
A03	Keyboard	500	S02
A04	Mouse	300	S01
A05	Mother Board	13000	S02
A06	Keyboard	400	S03
A07	LCD	6000	S04
T08	LCD	5500	S05
T09	Mouse	350	S05
T10	Hard Disk	4500	S03

Write the SQL queries for (i) to (iv) and output for (v) to (viii)

- (i) To display Name and Price of all the Accessories in ascending order of their Price. Ans `SELECT Name,Price FROM ACCESSORIES ORDER BY Price;`
- (ii) To display Id and SName of all Shoppe located in Nehru Place Ans `SELECT Id,SName FROM SHOPPE WHERE Area="Nehru Place";`
- (iii) To display Minimum and Maximum Price of each Name of Accessories. Ans `SELECT Name,Min(Price), Max(Price) FROM ACCESSORIES GROUP BY Name;`
- (iv) To display Name, Price of all Accessories and their respective SName where they are available. Ans `SELECT Name,Price,SName FROM ACCESSORIES, SHOPPE WHERE ACCESSORIES.Id =SHOPPE.Id ;`
- (v) `SELECT DISTINCT NAME FROM ACCESSORIES WHERE PRICE >= 5000;`

Q.51. 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

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.
(ii)	To display the CNAME of all the customers from the table TRAVEL who are traveling by vehicle with code V01 or V02.
(iii)	To display the CNO and CNAME of those customers from the table TRAVEL who travelled between '2015-12-31' and '2015-05-01'.
(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.

Q.52. Name the law shown below and verify it using a truth table.

$$X + X' \cdot Y = X + Y.$$

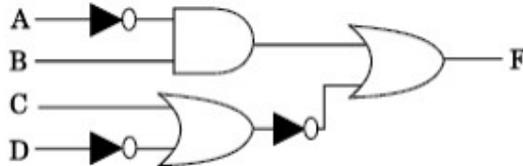
Q.53. Verify the following using Boolean Laws.

$$U' + V = U'V' + U' \cdot V + U \cdot V$$

Q.54. Verify the following using Boolean Laws.

$$X' + Y'Z = X' \cdot Y' \cdot Z' + X' \cdot Y \cdot Z' + X'Y \cdot Z + X' \cdot Y' \cdot Z + X \cdot Y' \cdot Z$$

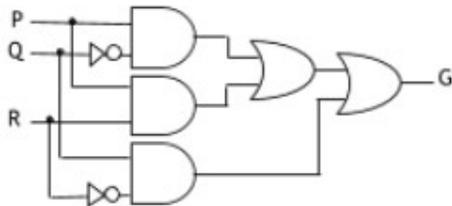
Q.55. Obtain the Boolean Expression for the logic circuit shown below :



Q.56. Draw the Logic Circuit for the following Boolean Expression :

$$(X' + Y) \cdot Z + W'$$

Q.57. Write the Boolean Expression for the result of the Logic Circuit as shown below:



Q.58. Write the Product of Sum form of the function  $F(X, Y, Z)$  for the following truth table representation of  $F$  :

X	Y	Z	$F(X, Y, Z)$
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

Q.59. Derive a Canonical POS expression for a Boolean function  $F$ , represented by the following truth table:

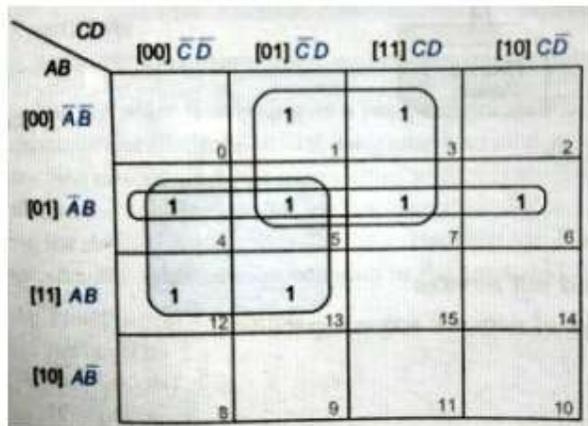
A	B	C	F(P, Q, R)
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

Q.60. Derive a Canonical SOP expression for a Boolean function G, represented by the following truth table:

A	B	C	G(A, B, C)
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

Q.61. Reduce the following Boolean Expression to its simplest form using K-Map :  
 $F(X, Y, Z, W) = \Sigma(0, 1, 4, 5, 6, 7, 8, 9, 11, 15)$

Q.62. Obtain the minimal form for the following Boolean expression using Karnaugh's Map :  
 $F(A, B, C, D) = \Sigma(1, 3, 4, 5, 6, 7, 12, 13)$ .



Q.63. Write two characteristics of Wi-Fi.

Q.64. Illustrate the layout for connecting 5 computers in a Bus and a Star topology of Networks.

Q.65. Differentiate between PAN and LAN types of networks.

Q.66. What is the difference between E-mail and Chat ?

Q.67. What kind of data gets stored in cookies and how is it useful?

Q.68. Which protocol helps us to transfer files to and from a remote computer?

Q.69. GPRS and GSM Expand the following :

Q.70. Differentiate between packet switching over message switching?

Q.71. Write two advantages of 3G over 2G Mobile Telecommunication Technologies in terms of speed and services?

Q.72. Which type of network (out of LAN, PAN and MAN) is formed, when you connect two mobiles using Bluetooth to transfer a video?

Q.73. Out of the following, which is the fastest (i) wired and (ii) wireless medium of communication?

Q.74. Write two characteristics of Web 2.0.

Q.75. Write names of any two popular Open Source Software, which are used as Operating Systems.

Q.76. What is Trojan Horse? What is the basic difference between Computer Worm and Trojan Horse?

Q.77. Write any two important characteristics of Cloud Computing.

Q.78. Out of the following, which all comes under cyber crime?

(i) Stealing away a brand new hard disk from a showroom.

(ii) Getting in someone's social networking account without his consent and posting on his behalf.

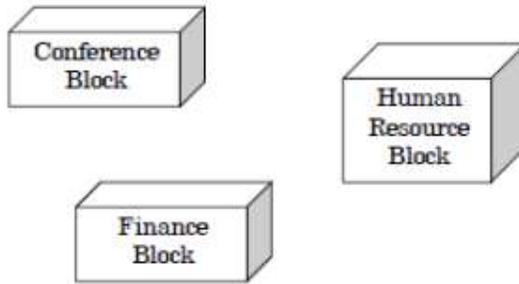
(iii) Secretly copying data from server of a organization and selling it to the other organization.

(iv) Looking at online activities of a friends blog.

Q.79. Categories the following under Client side and Server Side script category? (1) Java Script (2) ASP (3) VB Sript (4) JSP

Q.80. Tech Up Corporation (TUC) is a professional consultancy company. The company is planning to set up their new offices in India with its hub at Hyderabad. As a network adviser, you have to understand their requirement and suggest to them the best available solutions. Their queries are mentioned as (i) to (iv) below.

### Physical Locations of the blocks of TUC

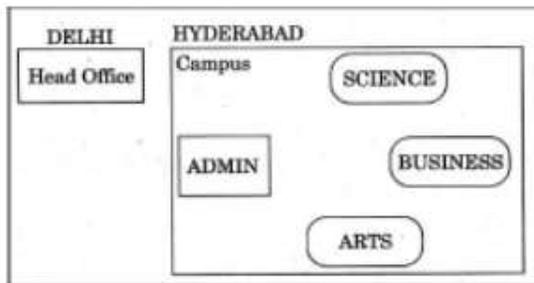


Block to Block Distance: (Mtrs)	
Human Resource to Conference	60
Human Resource to Finance	120
Conference to Finance	80

Number of Computers to be installed	
Human Resource	125
Finance	25
Conference	60

- (i) What will most appropriate block, where TUC should plan to install their server?
- (ii) Draw a block to block cable layout to connect all the buildings in the most appropriate manner for efficient communication.
- (iii) What will be the best possible connectivity out of the following, you will suggest to connect the new setup of offices in Bangalore with its London based office ?
  - Infrared
  - Satellite Link
  - Ethernet Cable
- (iv) Which of the following devices will be suggested by you to connect each computer in each of the buildings?
  - Gateway
  - Switch
  - Modem

Q.81. Xcelencia Edu Services Ltd. is an educational organization. It is planning to set up its India campus at Hyderabad with its head office at Delhi. The Hyderabad campus has 4 main buildings - ADMIN, SCIENCE, BUSINESS and MEDIA. You as a network expert have to suggest the best network related solutions for their problems raised in (i) to (iv), keeping in mind the distances between the buildings and other given parameters.

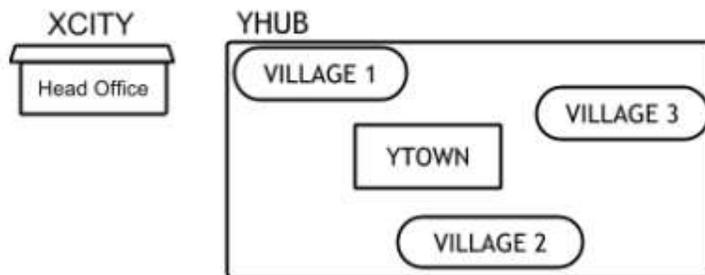


Shortest distances between various locations:	
ADMIN to SCIENCE	65 M
ADMIN to BUSINESS	100M
ADMIN to ARTS	60M
SCIENCE to BUSINESS	75M
SCIENCE to ARTS	60M
BUSINESS to ARTS	50M
DELHI Head Office to HYDERABAD Campus	1600KM

Number of Computers installed	
ADMIN	100
SCIENCE	85
BUSINESS	40
ARTS	12
DELHI HEAD OFFICE	20

- (i) Suggest the most appropriate location of the server inside the HYDERABAD campus (out of the 4 buildings), to get the best connectivity for maximum no. of computers. Justify your answer.
- (ii) Suggest and draw the cable layout to efficiently connect various buildings 'within the HYDERABAD campus for connecting the computers.
- (iii) Which hardware device will you suggest to be procured by the company to be installed to protect and control the Internet uses within the campus?
- (iv) Which of the following will you suggest to establish the online face-to-face communication between the people in the Admin Office of HYDERABAD campus and DELHI Head Office?
  - (a) E-mail (b) Text Chat (c) Video Conferencing (d) Cable TV

Q.82. Intelligent Hub India is a knowledge community aimed to uplift the standard of skills and knowledge 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 distances between various locations:	
VILLAGE 1 to YTOWN	2 KM
VILLAGE 2 to YTOWN	1.5 KM
VILLAGE 3 to YTOWN	3 KM
VILLAGE 1 to VILLAGE 2	3.5 KM
VILLAGE 1 to VILLAGE 3	4.5 KM
VILLAGE 2 to VILLAGE 3	3.5 KM
CITY Head Office to YHUB	30 Km

Number of Computers installed	
YTOWN	100
VILLAGE 1	10
VILLAGE 2	15
VILLAGE 3	15
CITY OFFICE	5

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 YHUB (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 YHUB.

(iii) Which hardware device will you suggest to connect all the computers within each location of YHUB?

(iv) Which service/protocol will be most helpful to conduct live interactions of Experts from Head Office and people at YHUB locations?