NETWORKING CLASS XII
Long Answer Type Questions

Question 1:
Indian School, in Mumbai is starting up the network between its different wings. There are four Buildings named as SENIOR, JUNIOR, ADMIN and HOSTEL as shown below:

SENIOR

JUNIOR

ADMIN

HOSTEL

The distance between various buildings is as follows:

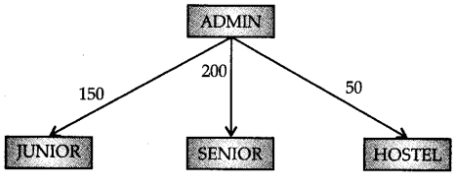
ADMIN TO SENIOR	200m
ADMIN TO JUNIOR	150m
ADMIN TO HOSTEL	50m
SENIOR TO JUNIOR	250m
SENIOR TO HOSTEL	350m
JUNIOR TO HOSTEL	350m

Number of Computers in Each Building :

SENIOR	130
JUNIOR	80
ADMIN	160
HOSTEL	50

1. Suggest the cable layout of connections between the buildings.
2. Suggest the most suitable place (i.e., building) to house the server of this school, provide a suitable reason.
3. Suggest the placement of the following devices with justification.
    - Repeater
    - Hub/Switch
4. The organisation also has inquiry office in another city about 50-60 km away in hilly region. Suggest the suitable transmission media to interconnect to school and inquiry office out of the following :
    - Fiber optic cable
    - Microwave
    - Radiowave

Answer:

1. 

2. Server can be placed in the ADMIN building as it has the maxium number of computer.
3. Repeater can be placed between ADMIN and SENIOR building as the distance is more than 110 m.
4. Radiowaves can be used in hilly regions as they can travel through obstacles.

Question 2:
Vidya Senior Secondary Public School in Nainital is setting up the network between its different wings. There are 4 wings named as SENIOR(S), JUNIOR(J), ADMIN(A) and HOSTEL(H).

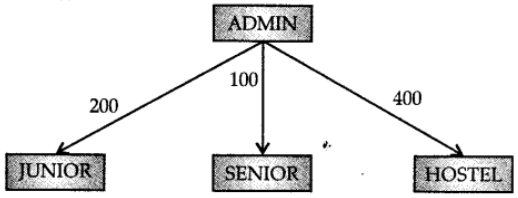
Distance between various wings are given below:

Wing A to Wing S	100 m
Wing A to Wing J	200 m
Wing A to Wing H	400 m
Wing S to Wing J	300 m
Wing S to Wing H	100 m
Wing J to Wing H	450 m

Wing	Number of Computers
Wing A	20
Wing S	150
Wing J	50
Wing H	25

1. Suggest a suitable Topology for networking the computers of all wings.
2. Name the most suitable wing where the Server should be installed. Justify your answer.
3. Suggest where all should Hub(s)/Switch(es) be placed in the network.
4. Which communication medium would you suggest to connect this school with its main branch in Delhi?

Answer:

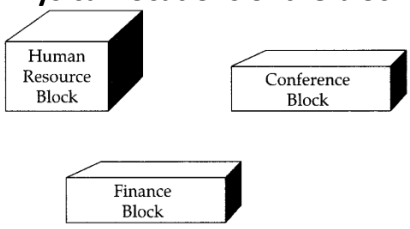
1. 

2. Server should be in Wing S as it has the maxi-mum number of computers. 1
3. All Wings need hub/switch as it has more than one computer.
4. Since the distance is more, wireless transmission would be better. Radiowaves are reliable and can travel through obstacles.

Question 3:

Trine Tech Corporation (TTC) 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 them the best available solutions. Their queries are mentioned as (i) to (iv) below.

Physical Locations of the blocked of TTC



Block to Block distances (in Mtrs.)

Block (From)	Block (To)	Distance
Human Resource	Conference	110
Human Resource	Finance	40
Conference	Finance	80

Expected number of computers to be installed in each block.

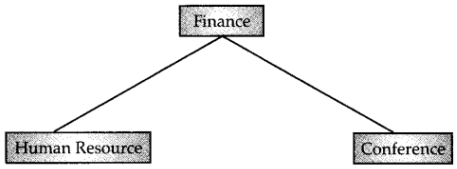
Block	Computers
Human Resource	25
Finance	120
Conference	90

1. What will be the most appropriate block, where TTC should plan to install their server?
2. Draw a block to cable layout to connect all the buildings in the most appropriate manner for efficient communication.

3. 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:
    - Satellite Link
    - Infrared
    - Ethernet Cable
4. Which of the following device will be suggested by you to connect each computer in each of the buildings:
    - Switch
    - Modem
    - Gateway

Answer:

1. Finance block because it has maximum number of computers.

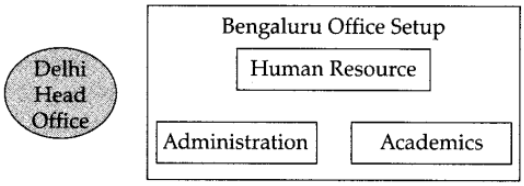


2.
3. Satellite link
4. Switch

Question 4:

G.R.K International Inc. is planning to connect its Bengaluru Office Setup with its Head Office in Delhi. The Bengaluru Office G.R.K. international Inc. is spread across and area of approx. 1 square kilometer, consisting of 3 blocks – Human Resources, Academics and Administration.
You as a network expert have to suggest answers to the four queries (i) to (iv) raised by them.

Notes: Keep the distance between blocks and number of computers in each block in mind, while providing them the solutions.



Shortest distances between various blocks:

Human Resources to Administration	100 m
Human Resources to Academics	65 m
Academics to Administration	110 m
Delhi Head Office to Bengaluru Office Setup	2350 km

Number of computers installed at various blocks are as follows:

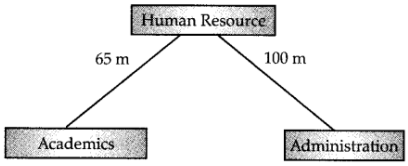
BLOCK	No. of Computers
Human Resources	155
Administration	20
Academics	100
Delhi Head Office	20

1. Suggest the most suitable block in the Bengaluru Office Setup, to host the server. Give a suitable reason with your suggestion.
2. Suggest the cable layout among the various blocks within the Bengaluru Office Setup for connecting the Blocks.
3. Suggest a suitable networking device to be installed in each of the blocks essentially required for connecting computers inside the blocks with fast and efficient connectivity.

4. Suggest the most suitable media to provide secure, fast and reliable data connectivity between Delhi Head Office and the Bengaluru Office Setup.

Answer:

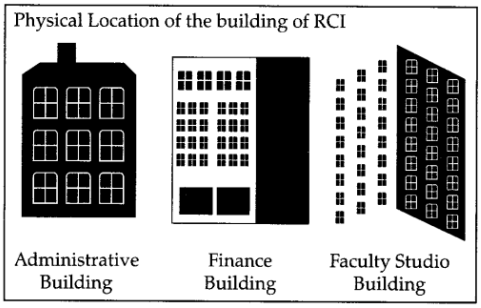
1. Human Resources because it has maximum number of computers.
2. (ii)



3. Switch 1
4. Satellite link

Question 5:

Rovenza Communications International (RCI) is an online corporate training provider company for IT related courses. The company is setting up their new campus in Kolkata. You as a network expert have to study the physical locations of various blocks and the number of computers to be installed. In the planning phase, provide the best possible answers for the queries (i) to (iv) raised by them.



Block to Block Distances(in Mtrs.)

From	To	Distance
Administrative Building	Finance Building	60
Administrative Building	Faculty Studio Building	120
Finance Building	Faculty Studio Building	70

Expected computers to be installed in each block

Buildings	Computers
Administrative Building	20
Finance Building	40
Faculty Studio Building	120

1. Suggest the most appropriate block, where RCI should plan to install the server.
2. Suggest the most appropriate block to block cable layout to connect all three blocks for efficient communication.
3. Which type of network out of the following is formed by connecting the computers of these three blocks?
   - LAN
   - MAN
   - WAN
4. Which wireless channel out of the following should be opted by RCI to connect to students from all over the world?
   - Infrared
   - Microwave
   - Satellite

Answer:

1. Faculty Recording Block.
2. Star topology
3. LAN
4. Satellite connection

Question 6:

(i) Identify the type of topology on the basis of the following:

- Since every node is directly connected to the server, a large amount of cable is needed which increases the installation cost of the network.
- It has a single common data path connecting all the nodes.

Answer:

1. Star Topology
2. Bus Topology

(ii) Expand the following

1. VOIP
2. SMTP

Answer:

1. Voice Over Internet Protocol
2. Simple Mail Transder Protocol

(iii) Who is a hacker?

Answer:

A computer enthusiast, who uses his computer programming skill to intentionally access a computer without authorization is known as hacker. A hacker accesses the computer without the intention of destroying data or maliciously harming the computer.

(iv) Daniel has to share the data among various computes of his two offices branches situated in the same city. Name the network (out of LAN, WAN, PAN and MAN) which is being formed in this process.

Answer:

MAN

Question 7:

Rehaana Medicos Center has set up its new center in Dubai. It has four buildings as shown in the diagram given below:

Distances between various buildings are as follows :

Accounts to Research Lab	55 m
Accounts to Store	150 m
Store to Packaging Unit	160 m
Packaging Unit to Research Lab	60 m
Accounts to Packging Unit	125 m
Store to Research Lab	180 m

Number of Computers:

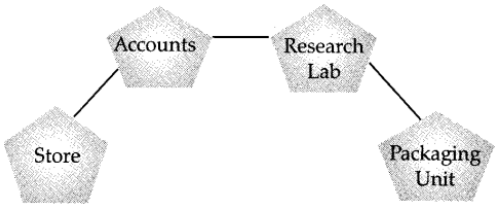
Accounts	25
Reserach Lab	100
Store	15
Packging Unit	60

Provide the best possible answer for the following queries:

1. Suggest a cable layout of connections between the buildings.
2. Suggest the most suitable place (i.e. building) to house the server of this organization.
3. Suggest the placement of the following device with justification:
4. Repeater (b) Hub/Switch
5. Suggest a system (hardware/software) to prevent unauthorized access to or from the network.

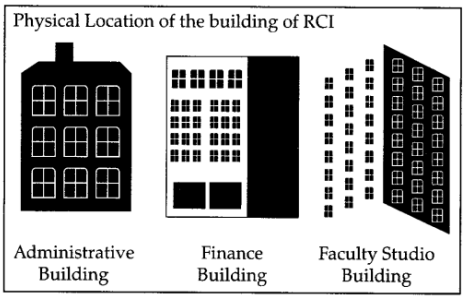
Answer:

1. Layout 1
2. The most suitable place / building to house the server of this organization would be building Research Lab, as this building contains the maximum number of computers.
3. Since the cabling distance between Accounts to Store is quite large, so a repeater would ideally be needed along their path to avoid loss of signals during the course of data flow in this route.
4. Firewall.



Question 8:

1. What is the difference between domain name and IP address?
2. Write two advantages of using an optical fibre cable over an Ethernet cable to connect two service stations, which are 190 m away from each other.
3. Expertfa Professsional Global (EPG) is an online, corporate training provider company for IT related courses. The company is setting up their new campus in Mumbai. You as a network expert have to study the physical locations of various buildings and the number of computers to be installed. In the planning phase, provide the best possible answer for the following questions-



Building to Building distances (in Mtrs.)

From	To	Distance
Administrative Building	Finance Building	60
Administrative Building	Faculty Studio Building	120
Finance Building	Faculty Studio Building	70

Buildings	Computers
Administrative Building	20
Finance Building	40
Faculty Studio Building	120

1. Suggest the most appropriate building, where EPG should plan to install the server.
2. Suggest the most appropriate building to building cable layout to connect all three buildings for efficient communication.

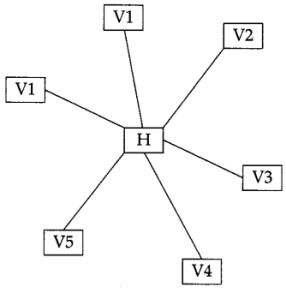
3. Which type of network out of the following is formed by connecting the computers of these three buildings?
    - LAN
    - MAN
    - WAN
4. Which wireless channel out of the following should be opted by EPG to connect to students of all over the world?
    - Infrared
    - Microwave
    - Satellite

Answer:

1. Domain Name is alphanumeric address of a resource over network IP address is a Numeric Address of a resource in a Network.
   Example:
   Domain Name 1
   www.Gabsclasses.com
   IP Address
   102.112.0.153
2. Optical fibre Advantages:
    - Faster Communication.
    - Free from electrical & Noise interference.
3. (a) Faculty Studio Building
   (b) Bus Topology
   (c) LAN
   (d) Satellite

Question 9:

To provide telemedicine faculty in a hilly state, a computer network is to be setup to connect hospitals in 6 small villages (VI, V2, …, V6) to the base hospital (H) in the state capital. This is shown in the following diagram.



No village is more than 20 km away from the state capital.

(a) Imagine yourself as a computer consultant for this project & answer the following questions with justification:

1. Out of the following what kind of link should be provided to setup this network: Microwave link, Radio Link, Wired Link?
2. What kind of network will be formed: LAN, MAN, or WAN?
3. Many times doctors at village hospital will have to consult senior doctors at the base hospital. For this purpose, how should they contact them: using email, SMS, telephone, or video conference?

(b) Out of SMTP and POP3 which protocol is used to receive emails?
(c) What are cookies in the context of computer networks?
(d) Mention any one difference between free-ware and free software.

Answer:

(a)

1. Radio Link
2. MAN
3. e-mail

(b) POP3

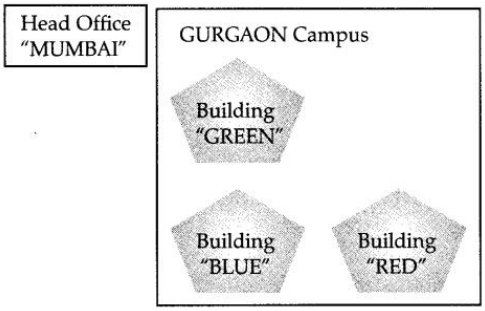
(c) Cookies are files that store user information that is used to identify the user when he logs into the system.

(d) Server-side script

Question 10:

Workalot Consultants are setting up a secured network for their office campus at Gurgaon for their day-to-day office and web-based activities. They are planning to have connectivity between three buildings and the head office situated in Mumbai.

Answer the questions 1 to 4 after going through the building positions in the campus and other details, which are given below :



Distances between various buildings:

Building "GREEN" to Building "RED"	110 m
Building "GREEN" to Building "BLUE"	45 m
Building "BLUE" to Building "RED"	65 m
Gurgaon Campus to Head Office	1760 km

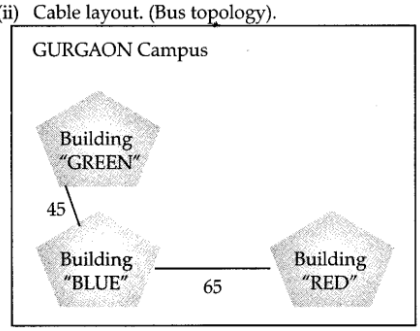
Number of computers

Building "GREEN"	32
Building "RED"	150
Building "BLUE"	45
Head Office	10

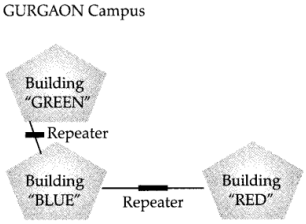
1. Suggest the most suitable place (i.e., building) to house the server of this organization. Also give a reason to justify your suggested location.
2. Suggest a cable layout of connections between the buildings inside the campus.
3. Suggest the placement of the following devices with justification:
   - Repeater.
   - Switch.
4. The organization is planning to provide a high speed link with its head office situated in Mumbai using a wired connection. Which of the following cables will be most suitable for this job?
   - Optical Fiber
   - Co-axial Cable
   - Ethernet Cable

Answer:

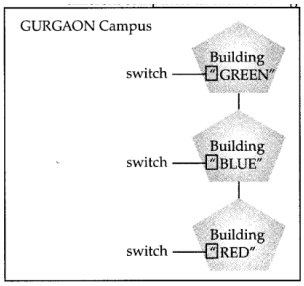
1. The most suitable place to install server is building "RED" because this building have maximum computer which reduce communication delay
2. (ii) Cable layout. (Bus topology).



3. (a) Since the cabling distance between buildings GREEN, BLUE and RED are quite large, so a repeater each, would ideally be need along their path to avoid loss of signals during the course of data flow in their routes.



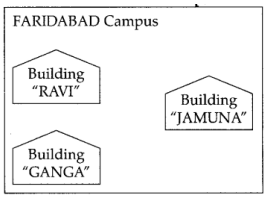
(b) In the layout a switch each, would be needed in all the buildings, to interconnect the group of cables from the different computers in each building.



4. Optical fiber

Question 11:

Granuda Consultants are setting up a secured network for their office campus at Faridabad for their day to day office and web based activities. They are planning to have connectivity between 3 building and the head office situated in Kolkata. Answer the questions (i) to (iv) after going through the building positions in the campus and other details, which are given below:



Distances between various buildings:

Building "RAVI" to Building "JAMUNA"	120 m
Building "RAVI" to Building "GANGA"	50 m
Building "GANGA" to Building "JAMUNA"	65 m
Faridabad Campus to Head Office	1460 km

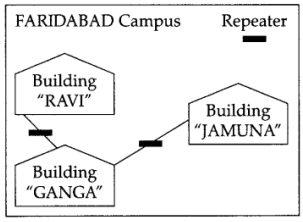
Number of Computers:

Building "RAVI"	25
Building "JAMUNA"	150
Building "GANGA"	51
Head Office	10

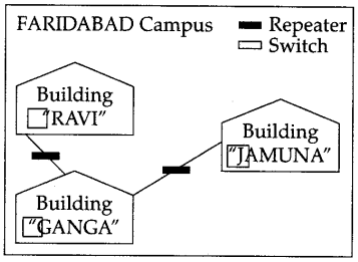
1. Suggest the most suitable place (i.e., block) to house the server of this organization. Also give a reason to justify your suggested location.
2. Suggest a cable layout of connections between the buildings inside the campus.
3. Suggest the placement of the following devices with justification:
   - Repeater
   - Switch
4. The organization is planning to provide a high speed link with its head office situated in the KOLKATA using a wired connection. Which of the following cable will be most suitable for this job?
   - Optical Fibre
   - Co-axial Cable
   - Ethernet Cable

Answer:

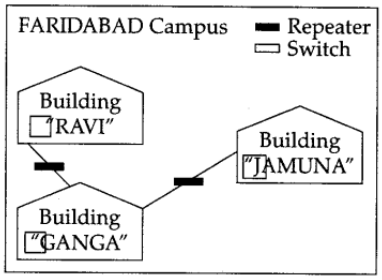
1. The most suitable place to install server is building "JAMUNA" because this building have maximum computer which reduce the communication delay.
2. Cable layout. (Bus topology).



3. (a) Since the cabling distance between buildings GANGA and JAMUNA are quite large, so a repeater each, would ideally be needed along their path to avoid loss of signals during the course of data flow in these routes.



(b) In the layout a switch each would be needed in all the building, to interco¬nnect the group of cables from the different computers in each building.

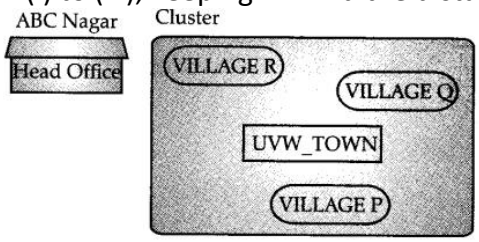


4. Optical fiber

Question 12:

India Skills Hub is a skill development community which has an aim to promote the standard of skills in the society. It is planning to set up its training centres 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 ABC Nagar, a town (UVW town) and 3 villages.

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 P TO UVW_TOWN	1.5 KM
VILLAGE Q TO UVW_TOWN	2.0 KM
VILLAGE R TO UVW_TOWN	1.0 KM
VILLAGE P TO VILLAGE Q	2.5 KM
VILLAGE P TO VILLAGE R	4.0 KM
VILLAGE Q TO VILLAGE R	2.3 KM
ABC Nagar Head Office to Cluster	28 KM

Number of computers installed at various locations are as follow :

UVW_TOWN	150
VILLAGE P	10
VILLAGE Q	15
VILLAGE R	20
ABC Nagar Head Office	5

Note:

– In Villagers, there are community centers, in which one room has been given as training entrer to this organization to install computers.

– The organization has got financial support from the government and top Multinational Organizations.

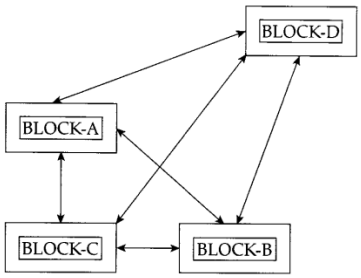
1. Suggest the most appropriate location of the SERVER in the Cluster (out of the 4 locations), to get the best and effective connectivity. Justify your answer.
2. Suggest the best wired medium and draw the cable layout (location to location) to efficiently connect various locations within the Cluster.
3. Which hardware device will you suggest to connect all the computers within each location of
4. Which service/protocol will be most helpful to conduct live interactions of Expersts from Head Office and peole at all locations of Cluster?

Answer:

1. Best location for the server is UVW-TOWN, because it is approximately equidistant from the village P, Q and R.
2. For connectivity between UVW-TOWN to head office is optic Fiber and to connect the villages, P, Q and R with server at UVW- TOWN is co-axial cable.
3. The villages R Q and R can be connected with server at UVW-TOWN by a Hub and the head office is connected by a Bus topology.
4. Between head office and UVWTOWN
   we recommend for Bus topology, so HTTP protocol and other terminal can be connected by UDP or FTP protocols.

Question 13:
Mudra publishing is a group of companies engaged in publishing IT related books located in the hilly area of Shimla. The companies are located in four different, blocks whose layout is shown in the following figure. Answer the questions (i) to (iv) with the relevant justifications.

Mudra publishing



Distance between various Blocks:

1. Block A to Block C is 50 m
2. Block A to Block D is 100 m
3. Block B to Block C is 40 m
4. Block B to Block D is 70 m
5. Block C to Block D is 125 m

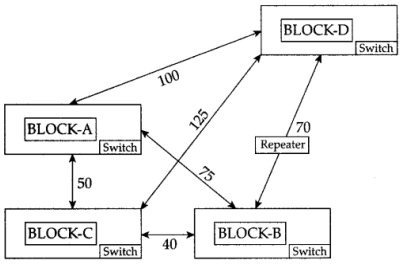
Number of Computers
Block A is 25
Block B is 50
Block C is 20
Block D is 120

1. Suggest a suitable network topology between the blocks.
2. Which is the most suitable block to house the server of this organization?
3. Suggest the placement of the following devices with justification
    - Repeater
    - Switch
4. The organization is planning to link the whole blocks to its marketing Office in Delhi. Since cable connection is not possible from Shimla, suggest a way to connect it with high speed.

Answer:

1. Suitable topology is bus topology.
2. The most suitable block for hosting server is BLOCK-D because this block has maximum number of computers.

Mudra Publishing

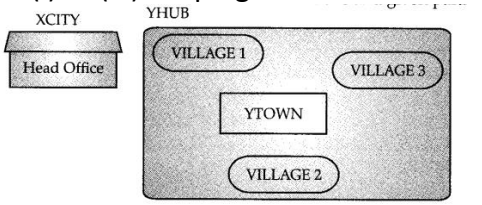


3. Switch is a device used to segment network into different sub-networks so switch will exist in all the blocks. Since distance between BLOCK-D and BLOCK-C is large so repeater will be install between BLOCK-D and BLOCK-C.
4. The most economic way to connect it with a reasonable high speed would be the use radiowave transmission, as they are easy to install, can travel long distance and penetrate buildings easily, so they are used for communication, both indoors and outdoors. Radiowaves also have the advantage of being omni-directional. They can travel in all the directions from the source, so that the transmitter and receiver do not have to be carefully aligned physically.

Question 14:

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 centres 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 given.

As a network consultant, you have to suggest the best network related solution for their issues/problems raised in (i) to (iv) keeping in mind the distance between various locations and given parameters.



Shortest distance between various locations:

VILLAGE 1 To YTOWN	2 KM
VILLAGE 2 To YTOWN	1.2 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 at various locations are as follows:

YTOWN	100
VILLAGE 1	10
VILLAGE 2	15
VILLAGE 3	15
CITY OFFICE	5

Note:

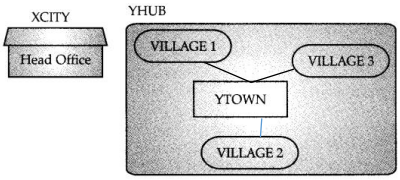
• In Villages, there are community centres, in which one room has been given as training center to this organization to install computers.

• The organization has got financial support from the government and top IT companies.

1. 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.
2. Suggest the best wired medium and draw the cable layout (location to location) to efficiently connect various locations within the YHUB.
3. Which hardware device will you suggest to connect all the computers within each location of YHUB?
4. Which server/protocol will be most helpful to conduct live interaction of Experts from Head office and people at YHUB locations?

Answer:

1 YTOWN
Justification
i. Since it has the maximum number of computers.
ii. It is closet to all other locations.
2 Optical Fiber



(iii) Switch or Hub
(iv) Video conferencing or VoIP or any other correct service/protocol.