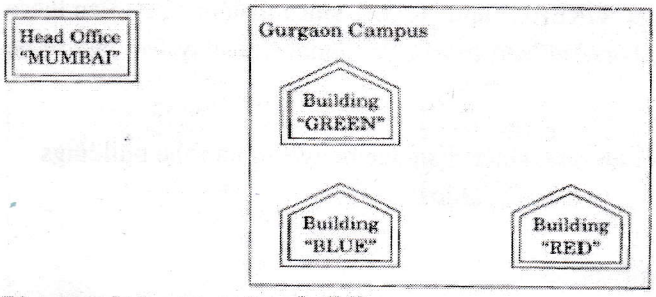
Network Concept Note

Q1. 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 3 buildings and the head office situated in Mumbai 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 "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

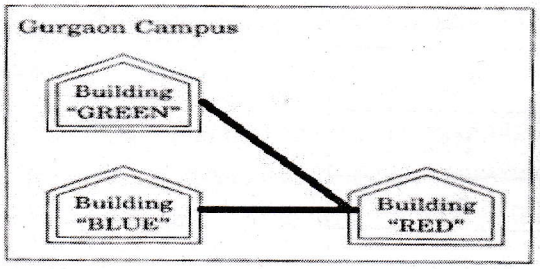
Building "GREEN"	32
Building "RED"	150
Building "BLUE"	45
Head Office	10

i) Suggest the most suitable place (Le. building) to house the server of this organization. Also give a reason to justify your location.

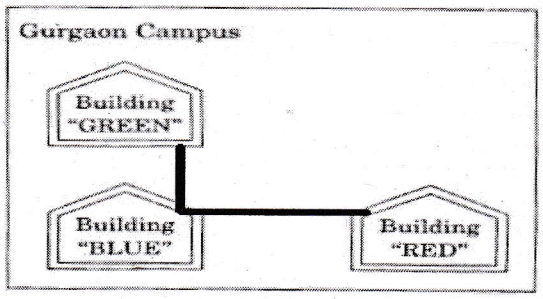
Ans : Building "RED", since it contains maximum number of computers
Building "BLUE", since it is closest to "GREEN" and "RED"

ii) Suggest a cable layout of connections between the buildings inside the campus.

Ans Layout 1:



Layout 2:



(ii) Suggest the placement of the following devices with justification:
(1) Switch (2) Repeater

Ans (1) Switch:

In each of the buildings, since a network switch is a networking device that joins multiple computers together within one local area network (LAN).

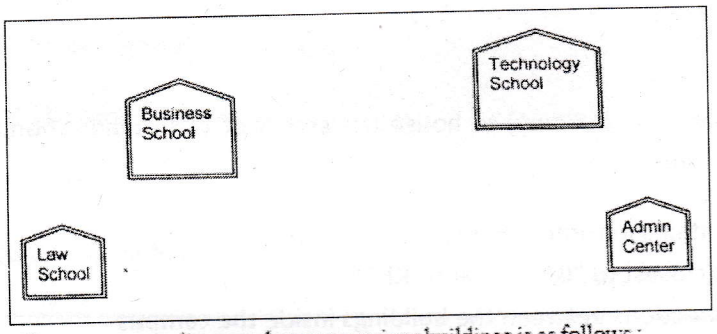
(2) Repeater:
For the Layout 1 drawn in (e2)- Between buildings "GREEN" and "RED", since distance between these two buildings is greater than 70 m which will otherwise lead to loss of signal intensity for data to be transferred.

For the Layout 2 drawn in (e2): Repeater is not needed, since distance between both the buildings connected to "Ganga" is less than 70 m, not leading to any signal loss
OR
Any other placement of Repeater with proper justification

(iii) The organization is planning to provide a high speed link with its head office situated in the MUMBAI using a wired connection. Which of the following cable will be most suitable for this job?
(i) Optical Fibre (ii) Co-axial Cable (iii) Ethernet Cable

Ans (i) Optical Fibre

Q2. Great Studies University is setting up its Academic schools at Sunder Nagar and planning to set up a network. The university has 3 academic schools and one administration center as shown in the diagram below:



Center to center distances between various buildings is as follows :

Law School to Business School	60m
Law School to Technology School	90m
Law School to Admin Center	115m
Business School to Technology School	40m
Business School to. Admin Center	45m
Technology School to Admin Center	25m

Number of Computers in each of the Schools/Center is follows:

Law School	25
Technology School	50
Admin Center	125
Business School	35

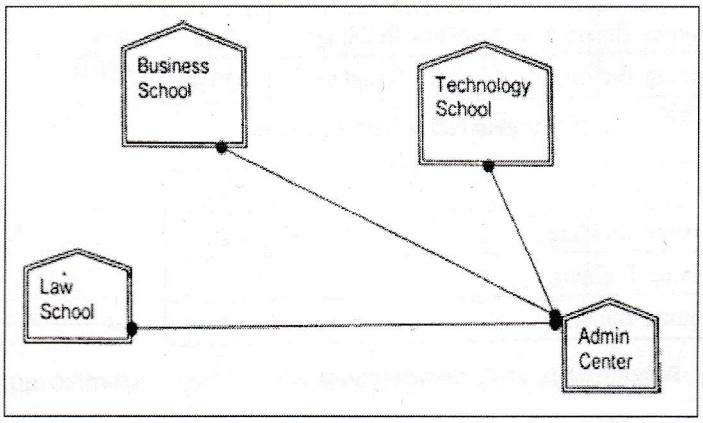
(i) Suggest the most suitable place (i.e. School/ Center) to install the server of this university with a suitable reason.

Ans Option 1 : Admin center as it has the most number of computers

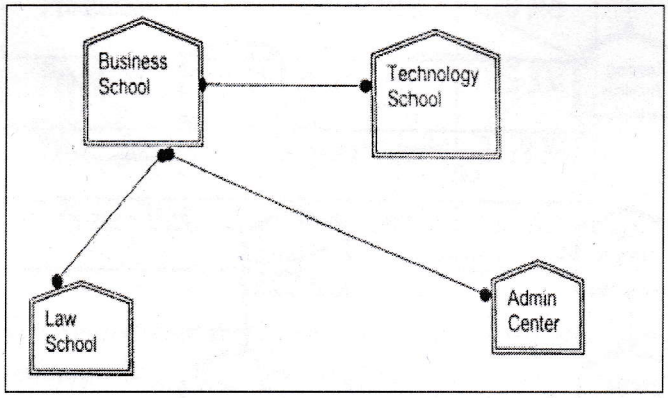
Option 2.Business School as it will require minimum cable length to connect other blocks

(ii) Suggest an ideal layout for connecting these schools/ center for a wired connectivity.

Ans Option 1:



Option 2:

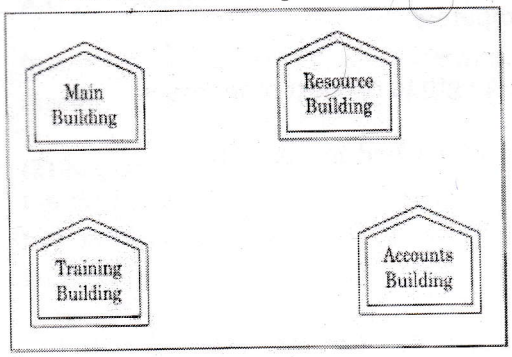


(iii) Which device will you suggest to be placed/installed in each of these schools / center to efficiently connect all the computers within these schools / center?

Ans Switch

(iv)The university is planning to connect its admission office in the closest big city, which is more than 350 km from the university. Which type of network out of LAN, MAN or WAN will be formed? Justify your answer.1 **Ans** WAN as the distance is more than the range of LAN or MAN.

Q3. "Vidya for All" is an educational NGO. It is setting up its new campus at Jaipur for its web-based activities. The campus has four buildings as shown in the diagram below:



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

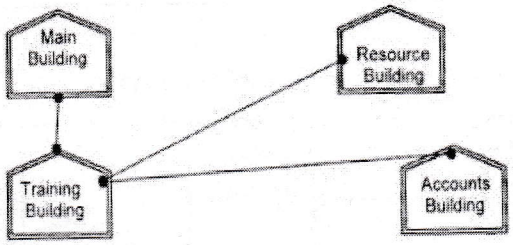
Main Building to Resource Building	120 m
Main Building to Training Building	40 m
Main Building to Accounts Building	135 m
Resource Building to Training Building	125 m
Resource Building to Accounts Building	45 m
Training Building to Accounts Building	110 m

Expected Number of Computers in each Building is as follows:

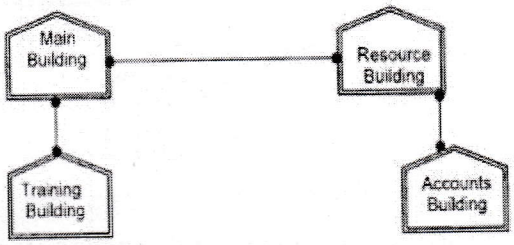
Main Building	15
Resource Building	25
Training Building	250
Accounts Building	10

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

Ans.



OR



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

Ans. Training Building as it contains maximum number of computers.

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

(i) Repeater(ii) Hub/Switch

Ans. (i) A Repeater should be placed when the distance between any two connecting buildings exceeds 70 m.

(ii) Every building will need one Hub / Switch, to send signals to all of the workstations connected to it

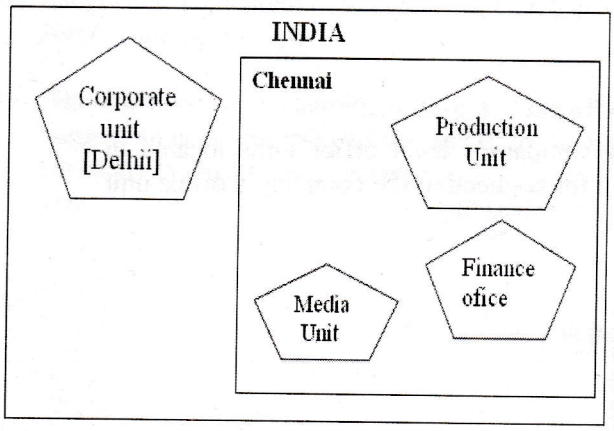
(e4) The NGO is planning to connect its International office situated in Delhi. Which out of the following wired communication links, will you suggest for a very high speed connectivity ?

(i) Telephone Analog Line(ii) Optical Fiber

(iii) Ethernet Cable

Ans. (ii) Optical Fibre

Q4."China Middleton Fashion" is planning to expand their network in India, starting with two cities in India to provide infrastructure for distribution of their product. The company has planned to setup their main office in Chennai at three different locations and have named their offices as "Production Unit", "Finance Unit" and "Media Unit ".The Company has its corporate unit in Delhi. A rough layout of the same is as follows:



Approximate distance between these Units is as follows:

From	To	Distance
Production Unit	Finance Unit	70 Mtr
Production Unit	Media Unit	15 KM
Production Unit	Corporate Unit	2112 KM
Finance Unit	Media Unit	15 KM

In continuation of the above, the company experts have planned to install the following number of computers in each of their offices:

Production Unit	158
Finance Unit	79
Media Unit	90
Corporate Unit	51

I. Suggest the kind of network required (out of LAN, MAN, WAN) for connecting each of the following office units:

i) Production Unit and Media Unit

ii) Production Unit and Finance Unit

Ans) Production Unit and Media Unit : **MAN**

Production Unit and Finance Unit : **LAN**

II. Which one of the following devices will you suggest for connecting all the computers with in each of their office units?

i) Switch/Hub ii) Modem ii) Telephone

Ans) Switch / Hub

III. Which of the following communication media, you will suggest to be procured by the company for connecting their local office units in Chennai for very effective (High Speed) communication?

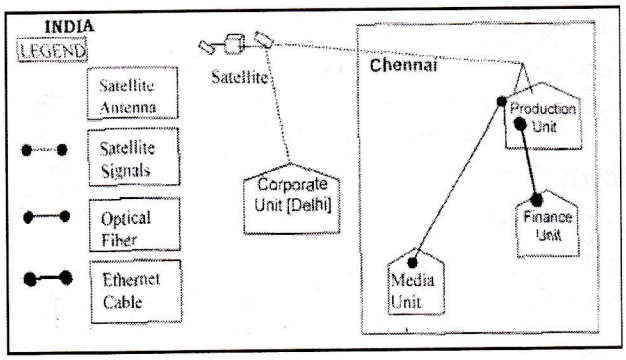
i) Telephone cable ii) Optical Fibre

iii) Ethernet Cable

Ans) Optical Fibre

IV. Suggest a cable/wiring layout for connecting the company's local office units located in Chennai. Also, suggest an effective method/technology for connecting the company's office unit located in Delhi.

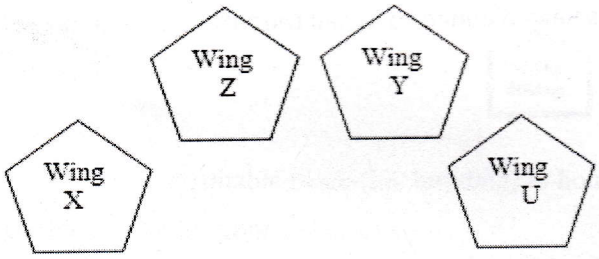
Ans)



Optical Fiber/Star Topology

Wireless/Satellite Link/leased Line

Q5. The Cyber Mind Organization has set up its new Branch at Mizoram for its office and web based activities. It has 4 Wings of buildings as shown in the diagram:



Center to center distances between various blocks

Wing X to Wing Z	40 m
Wing Z to Wing Y	60 m
Wing Y to Wing X	135 m
Wing Y to Wing U	70 m
Wing X to Wing U	165 m
Wing Z to Wing U	80 m

Number of computers

Wing X	50
Wing Z	130
Wing Y	40
Wing U	15

I. Suggest a most suitable cable layout of connections between the Wings, and topology.
Ans: Same as Previous

II. Suggest the most suitable place (i.e., Wing) to house the server of this organization with a suitable reason, with justification.
Ans : Wing Z as it has largest number of computers

III. Suggest the placement of the following devices with justification:
Ans: Same as Previous

IV. The organization is planning to link its head office situated in Delhi with the offices at Srinagar.1m Suggest an economic way to connect it; the company is ready to compromise on the speed of connectivity. Justify your answer.
Ans: TCP/IP Dial Up (Most Suitable answer 1)

OR

Telephone Link (Most Suitable answer 2)

OR

Microwave

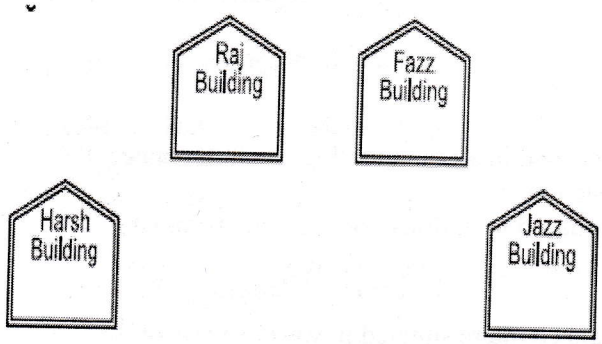
OR

Radio Link/Radio Wave

OR

Satellite Link **OR** WAN

Q6. Ravya Industries has set up its new center at Kaka Nagar for its office and web based activities. The company compound has 4 buildings as shown in the diagram below:

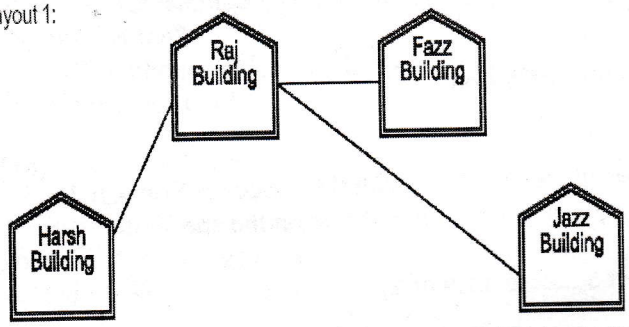


Center to center distances between various buildings is as follows:	
Harsh Building to Raj Building	50 m
Raz Building to Fazz Building	60 m
Fazz Building to Jazz Building	25 m
Jazz Building to Harsh Building	170 m
Harsh Building to Fazz Building	125 m
Raj Building to Jazz Building	90 m
Number of Computers in each of the buildings is follows:	
Harsh Building	15
Raj Building	150
Fazz Building	15
Jazz Building	25

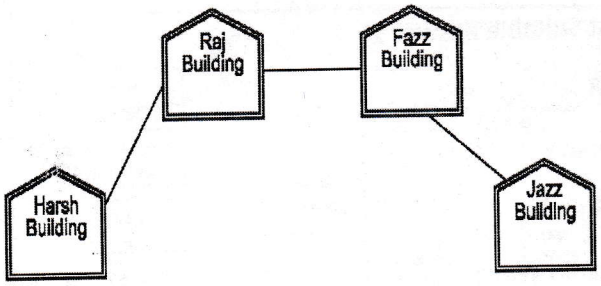
e1) Suggest a cable layout of connections between the buildings.

Ans:

Layout 1:



Layout 2: Since the distance between Fazz Building and Jazz Building is quite short



e2) Suggest the most suitable place (i.e. building) to house the server of this organization with a suitable reason.

Ans) The most suitable place / block to house the server of this organisation would be Raj Building, as this block contains the maximum number of computers, thus decreasing the cabling cost for most of the computers as well as increasing the efficiency of the maximum computers in the network.

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

i. Internet Connecting Device/Modem
ii. Switch

Ans: (i)Raj Building

(ii) In both the layouts, a hub/switch each would be needed in all the buildings, to interconnect the group of cables from the different computers in each block

e4) The organisation is planning to link its sale counter situated in various parts of the same city, which type of network out of LAN, MAN or WAN will be formed? Justify your answer.

Ans) The type of network that shall be formed to link the sale counters situated in various parts of the same city would be a MAN, because MAN (Metropolitan Area Networks) are the networks that link computer facilities within a city.

NETWORKS FULL FORMS

TCP/IP – Transmission Control Protocol / Internet Protocol

LAN – Local Area Network

MAN – Metropolitan Area Network

WAN – Wide Area Network

Modem – Modulation(tor)/Demodulation(tor)