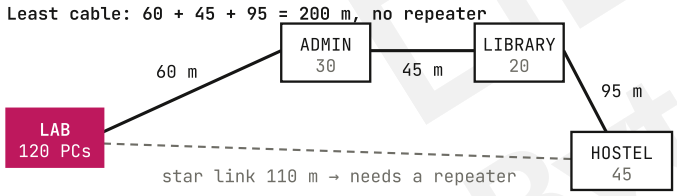
Importance ■■■■■ most asked ■■■□□ often ■□□□□ rarely

The 5-mark campus case study ■■■■■

A company or school has 4 blocks (computers in each, distances between them) and often a head office far away. Answer the parts in this order. **Every answer needs a reason**: the reason is half the mark.

IF ASKED	ANSWER
Where to put the server	Block with the **most computers** Most traffic stays inside one block. Tie: the block nearest the others.
Cable layout	Join all blocks with the **least total cable** From the server block, keep adding the shortest link to a block not yet joined. 4 blocks → 3 links. "Centralised control" → star from the server.
Device inside each block	**Switch** (hub accepted) Joins the PCs of one block into a LAN.
Where a repeater goes	On every **drawn** link over **100 m** Ethernet signal weakens after ~100 m. None over 100 m → "not needed".
Internet for all blocks	**Router** (with modem) in the server block
Type of network	Same campus **LAN** · same city ≤ 40 km **MAN** · another city **WAN** Quote the distance: "WAN, as Delhi is 600 km away".
Cable / medium	Inside campus: **twisted pair** (cheap) · fast wired link far away: **optical fibre** · hilly or very far: **microwave / satellite**
Video meeting	**VoIP**, Voice over Internet Protocol
Stop unauthorised access	**Firewall**
Website with logins	**Dynamic**: content changes per user



! Check repeaters only on the links **you drew**, not every distance in the table. Write the total length next to your diagram.

Network devices ■■■■■

DEVICE	ONE JOB	QUESTION CLUE
Modem	Digital ↔ analog over a phone or cable line	"modulation / demodulation"
Hub	Joins PCs in a LAN; sends data to **all** ports	"not intelligent"
Switch	Joins PCs in a LAN; sends only to the **right** port (MAC)	"inside each block"
Repeater	Regenerates a weak signal	"signal weakens", > 100 m
Router	Joins networks; best path by **IP** address	"connect to the ISP"
Gateway	Joins networks with **different protocols**	"entry and exit point"

	HUB	SWITCH
Sends to	every port	only the receiver's port
Smart?	no	yes, learns MAC addresses
Traffic	collisions, slower	fewer collisions, faster

! **Router** joins networks using the **same** protocol; **gateway** joins **different** protocols. A firewall is not a device in the list but is the answer to "prevent unauthorised access".

Protocols ■■■■□

A **protocol** is a set of rules the communicating devices follow for successful, reliable data communication.

Not a named IP topic, but IP papers ask these, mostly as 1-mark MCQs.

PROTOCOL	FULL FORM	USED FOR
HTTP	HyperText Transfer Protocol	web pages, browser ↔ server
HTTPS	… Secure	web pages, encrypted (padlock)
FTP	File Transfer Protocol	upload / download files
SMTP	Simple Mail Transfer Protocol	**send** email
POP3	Post Office Protocol 3	**receive** (download) email
VoIP	Voice over Internet Protocol	voice / video calls over the Internet

! **SMTP sends, POP3 receives.** HTML is a language, not a protocol. Write VoIP's full form for the full mark.

Network types and topologies ■■■□□

TYPE	COVERS	EXAMPLE
PAN	one person, ~10 m	phone + earbuds by Bluetooth
LAN	room, building, campus	school computer lab
MAN	a city, ~30–40 km	city cable TV network
WAN	countries, the world	the Internet (largest WAN)

TOPOLOGY	LAYOUT	PLUS	MINUS
Bus	all on one backbone cable	least cable	backbone fails → all stop
Star	each PC to a central hub / switch	one PC fails → only it	centre fails → all stop
Tree	stars joined in levels (bus + star)	easy to expand	root fails → branches cut
Mesh	every PC to every other	most reliable	most cable: n(n−1)/2 links

! MCQ clues: single central cable → **bus**; needs a hub or switch → **star**; combination of two → **tree**. Ring is **not** in the syllabus; it appears only as a wrong option.

! Mesh links = n(n−1)/2: **4** computers need **6** links, **10** need **45**.

Internet, web and websites ■■■■■

	INTERNET	WWW
Is	the network of networks	linked web pages on it
Uses	TCP/IP	HTTP, HTML, URL
Began	1969, ARPANET	1989, Tim Berners-Lee, CERN

- **URL** (Uniform Resource Locator) = protocol + domain + path: `https://www.cbse.gov.in/index.html`
- **DNS** turns a domain name into an IP address.
- **Web page**: one document with its own URL. **Website**: related pages under one domain, starting at the home page.
- **Web server** stores and sends pages (Apache, Nginx). **Web hosting**: renting space on one so the site is on the Internet.

- **Static** page: fixed, same for all (About us). **Dynamic**: built on request from a database (cart, results, feed).
- **Uses of the Internet**: web, email (not instant), chat (instant text), VoIP (calls, video meetings).

! "Service that puts a website on the Internet" → **web hosting**, not web server. Email and VoIP use the Internet but are **not** the Web.

Web browsers

Browser: software that finds, opens and shows web pages: Chrome, Firefox, Edge, Safari, Opera. Not a search engine (Google Search, Bing are websites).

	ADD-ON (EXTENSION)	PLUG-IN
Changes	the browser: adds a feature	what a page can show
Example	ad blocker, dictionary	Flash, PDF viewer

Cookie: small text file a site stores through your browser to remember you (login, cart, language). **Third-party** cookies track you for ads. A cookie is data, not a program, so it is not a virus.

Settings worth knowing: clear history and cookies, block third-party cookies, site permissions (location, camera), incognito window.

Network basics

A **computer network** is a group of interconnected computers and devices that share data and resources. A **node** is any device on it; a **link** joins two nodes.

Why network: resource sharing (one printer, one internet line), data sharing, communication, lower cost, backups on more than one computer.

Uses of the Internet

APPLICATION	REAL TIME?	BEST FOR
Web	—	finding information, online services
Email	no	formal messages, attachments
Chat	yes, text	quick conversations
VoIP	yes, voice / video	calls, video meetings

Email address: user name @ mail server's domain. **Cc**: copy seen by all; **Bcc**: hidden copy.

! "Live visual communication between two offices" → **video conferencing with VoIP**, not email or chat.

Putting a website online

Register a **domain name** → choose a **hosting plan** (shared, dedicated or cloud) → **upload** the files, often by FTP → point the domain to the server's IP in **DNS**.

Web server vs browser: the server stores and sends pages; the browser, on your device, asks for and shows them.

Expand it

MODEM	MOdulator–DEModulator
LAN · MAN	Local · Metropolitan Area Network
URL	Uniform Resource Locator (not "Universal")
DNS	Domain Name System
WWW	World Wide Web
ISP	Internet Service Provider

ByteBoard
notes.byteboard.in