

Past Exam Questions on this section. There may be some overlap in questions (Note – the references have changed. This section is now INFO2 3.2.4 Transfer of Data in IT Systems)

Topic 11.7 . Hardware

State, with reasons, **two** items of hardware that could be needed for a personal computer to connect to the Internet. (4 marks)

- Router (1) to provide a connection between the PC and phone line/LAN (1)
- Modem (1) to allow the computer to send/receive data over phone lines (1)
- Network Interface Card (1) to connect to a LAN that provides internet access (1)
- Wireless adaptor/card (1) connect to Wireless Access Point / Wireless Router (1)
- ALLOW Telephone line/cable (1) for transmission of data/to provide physical connection to ..NOT INTERNET (1) **Max 4 2 x (2,1,0)**

Topic 11.9 . Network Environments

A company is having a sixteen-station Local Area Network (LAN) installed.

(a) Describe what is meant by the term Local Area Network.

(b) Give two suitable topologies for the LAN and, for each one, draw a labelled diagram to show its structure.

(c) State three items of hardware and/or software that could be needed if the LAN is to be connected to the Internet. (2 marks)(6 marks)(3 marks)

(a)

- Two or more computers linked together communicating / sharing resources
- A network that is restricted to a single site/building/campus
- physical connection is possible e.g. cable/UTP/fibre optic cable but wireless can be used
- allowing high speed transmission of data. Max 2

(b)

- Star (1) suitable diagram(1) labelled (1) *Max 1 if topology not named or named incorrectly*
 - Ring (1) suitable diagram (1) labelled (1) *Max 1 if topology not named or named incorrectly*
 - Bus (1) suitable diagram (1) labelled (1) *Max 1 if topology not named or named incorrectly*
- Any 2 x (3, 2, 1, 0) Max 6

(c)

- Router • Firewall • Modem • (Web) browser software • email software • anti-spyware/anti-virus software • ALLOW telephone socket or phone line. Max 3

Topic 11.9 - Network Environments

Topic 11.7 . Hardware; nature capabilities and limitations

There are ten employees in a local estate agent's office. Each employee uses a networked PC on a Local Area Network (LAN).

(a) Give **four** benefits to the office of using a network rather than stand-alone PCs.

(b) The office is part of a national chain that is connected together over a Wide Area Network (WAN).

(ii) Explain the difference between a LAN and a WAN.

(iii) Give **two** benefits to the estate agent.s office of using the WAN.

(c) The local office has purchased a digital camera to take pictures of the houses that it is selling.

Give **two** benefits to the office of using a digital camera.

(4 marks) (4 marks)(2 marks)(2 marks)

Topic 11.9 - Network Environments

Topic 11.7 . Hardware; nature capabilities and limitations

(a)

- centralisation of services.
- e.g. software installation, backups, printing, security, monitoring etc

Allow two different examples of centralised services

- servers provide centralised storage (of data)
- servers provide centralised storage of programs

Must mention both data and programs for two marks on storage

- more flexible use of equipment e.g. employees able to use any available computer
- improved communications ...
- e.g. internal email provides a record of communications,/ reduces the need to meet in real time as staff may frequently be out of the office etc. **Max 4**

(i)

- Difference in reach (1) LAN restricted to a single site/building/campus (1) WAN more than one site/geographically remote locations (1)
- Difference in type of connection (1) LAN can be connected via direct link/physical link/co-axial cable/UTP/fibre optic cable/wireless/owned (1) WAN connection via satellite link, modem, telephone line/leased/shared (1)
- Difference in speed of transmission of data (1) LAN high speed (10Mb, 100Mb etc) (1) WAN generally slower (1Mb typical broadband) (1) **Max 4**

Topic 11.9 . Network Environments

The term used to describe the arrangement of computers in a network is topology.

*Name **two** different Local Area Network (LAN) topologies and draw a diagram to illustrate each one.*

(4 marks)

- bus (1) structure must be diagram and match name (1)
- star (1) structure must be diagram and match name (1)
- ring (1) structure must be diagram and match name (1)

Allow one mark for a correct diagram **2 x (2, 1, 0) 4**

Topic 11.9 - Network Environments

A school has a Local Area Network (LAN).

*(a) Describe **two** advantages to the students of using a LAN rather than stand-alone computers.*

*(b) State **two** disadvantages to the students of using a LAN rather than stand-alone computers.*

4 marks 2 marks

(a)

- Can use any terminal (1)
- to access own files stored on the network (1)
- Software available at any terminal (1)
- Improved access to peripherals (1)
- e.g. range of printers available at all terminals (1)
- Central control of backup (1)
- no need to worry about taking copies of important work (1)
- can communicate with other LAN users (1)
- and share files/information (1)
- Can access Intranet for school information etc (1)

Any 4 allow extra mark for good expansion of the above points Max 4

(b)

- Slow response if network heavily used
- Limited storage capacity on server
- Restriction of file types stored on server
- Restrictions on number and/or type of printout
- If the server fails then no access to any network facilities
- Inability/limited ability to customise desktop etc
- Viruses can spread more quickly
- Online bullying. **Max 2**

NO MARKS for any answers to do with WANs or the INTERNET

11.9 . Network environments

A graphics design company uses a Local Area Network (LAN). The designers can use their computers 'stand alone' or as part of the network. The LAN has a star topology.

(a) Draw a diagram of the LAN and give one advantage of using a star topology.

(b) Describe one advantage to the designers of using their computers in 'stand alone' mode.

(c) Describe one advantage to the designers of working on the network.

(a)

- Diagram structure
- Direction of data flow/labelling of diagram
- Problems with one communications link do not affect the others
- Performance does not degrade under load **Max 3**

(b)

- Exclusive use of peripherals (e.g. scanner/printer)
- Pictures/animations may contain large amounts of data
- Designers may be kept waiting because of network activity
- Better security
- As data/files not available to others on the network
- Can continue to work if server fails
- Viruses less likely to be transferred
- Work not disrupted by electronic messages

ALLOW extra mark for expansion of point **Max 2**

(c)

- Data/information can be shared
- Designers can work on same project
- Shared software
- Shared peripherals
- Shared resources
- Data transfer is improved
- So communications are improved between users
- Centralised upgrading / installation of software
- Central control of security
- Centralised control of backup

ALLOW extra mark for expansion of point

Three colleges in a large city are to merge and become a single college spread across the three sites. Each college has a Local Area Network (LAN) and these networks are to be joined together to form a Wide Area Network (WAN).

- (a) Explain **two** differences between a LAN and a WAN.
 (b) Give **two** advantages to the merged college of using the new WAN.
 (c) State **two** problems that could occur when using the new WAN.

(a)

- LAN restricted to a single site/building/campus (1) WAN more than one site/geographically remote locations (1)
- LAN connected via direct line/physical link/co-axial cable/UTP/fibre optic cable/radio (1) WAN connection via satellite link, modem, telephone line, microwave (1)

(b)

- Staff/students can work/communicate across sites
- Software available across sites
- Data files available across sites
- Ability to backup at different locations

(c)

- Slower transmission speeds between sites
- Programs/data not available if communications link fails
- Funding implications of maintaining communications link
- Viruses spread easily between sites **Max 2**

(4 marks) (2 marks) (2 marks)

Describe two features of each of the following types of Local Area Network (LAN):

(a) peer-to-peer network;

(b) client-server network.

4 marks 4 marks

(a) Peer-to-peer

- Very simple network which provides shared resources.
- All computers have the same status.
- Any computer can access files/devices on any other computer (1) provided permissions have been set (1)
- Any computer can initiate and exchange data with any other.
- Allow 'any computer can act as a client or a server'
- Few additional facilities e.g. limited security.

ALLOW EXTRA MARK FOR GOOD DESCRIPTION OF ANY POINT

ALLOW ANY NON-DUPLICATED REVERSE POINTS

Any 2 x (2,1,0) or 4 x (1,0) or 1 x (2,1,0) and 2 x (1,0)

(b) Client-server

- Devices are treated as clients or servers, cannot be both.
- Clients send requests for services to servers.
- Servers provide central services (1) e.g. software installation, backups etc (1)
- Servers provide centralised storage of data.
- If the server goes down then the clients on the network cannot access the resources provided by the server.

ALLOW EXTRA MARK FOR GOOD DESCRIPTION OF ANY POINT

ALLOW ANY NON-DUPLICATED REVERSE POINTS

COST IS NOT A FEATURE

Any 2 x (2,1,0) or 4 x (1,0) or 1 x (2,1,0) and 2 x (1,0)

4 marks 4 marks

Topic 11.9 – Network environments

The term used to describe the arrangement of computers in a network is topology.

(a) Name, and draw diagrams to illustrate, two different Local Area Network (LAN) topologies.

4 marks

(b) State one different advantage for each topology that you have chosen. 2 marks

(a) Bus (allow line), star or ring must be diagram (allow other topologies if correct e.g. mesh, hybrid etc)

- Name
- Structure (only one mark if name contradicts structure)

$2 \times (2, 1, 0) 4$

(b) NB: STATE

- Bus – cost effective in certain installations/easy to install/easy to add stations to
- Ring – very fast transmission rates possible/fault tolerant
- Star – speed of transmission does not degrade under load/fault tolerant/extra computers can be added without disturbing the network

• Other – suitable advantage must be clear

$2 \times (1, 0) 2$ must match (a) if not labelled use same order 2

A small company is installing a computer network. Employees are to be issued with a handbook to help them to understand the networking terms. Provide an explanation of the following terms for the handbook.

(a) Local Area Network and Wide Area Network

(b) Server and peer-to-peer

(a) Max 5

- Network a set of computers and peripherals connected together
- Network enables sharing of data and resources
- All the computer systems are relatively close to each other e.g. the same building or cluster of buildings (LAN)
- Direct physical connection is possible (LAN) e.g. fibre optic/coax cables or Wireless Network
- Network connections are normally cables (LAN)
- Computers are geographically remote (WAN)
- A range of connection methods can be used e.g. satellite link, modem, telephone line, router, gateway (WAN) 5

(b) Max 5

- A computer/station on a network that provides a resource that can be used by any client station - server
- Provides access to storage – file server
- Provides access to network printer and print spooling – print server
- Provides access to shared information – database server
- Server not working means that clients do not have access to server controlled resources or (p-to-p) a station not working only means that the other stations do not have access to the resources on that station
- Clients/stations have access to resources/data controlled by other clients/stations (p-to-p)
- All stations on the network have similar status (p-to-p)
- Provides access to shared resources e.g. printers and storage (p-to-p) (if not given in (a)) 5

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