Revision list for assessment – Paper 1

PAPER ONE:

Threats to a network and prevention measures.

Threat	Prevention
Unauthorised access	2FA, strong passwords
Virus	Anti-virus, scan attachments
Worm	Anti-malware
Trojan	Training, anti-malware
Phishing	Awareness, check legitimate, report
Social engineering	Network policy to not give out any personal information such as passwords. Check identity
Data interception	Encryption
SQL injection	Validation and input sanitisation
Ransomware	Not clicking links in suspicious emails, taking care over downloads, don't disable security or enable macros on suspicious documents. BACKUP DATA!

LANs (including star vs mesh topology) and WANS

LAN – Small geographical area, e.g. single building such as home or business.

WAN – Over a wider geographical area, e.g. city-wide, countrywide or even international over the Internet using a router or modem to connect.

Star vs mesh topologies.

Ethernet – a protocol for transmitting data across a Local Area Network up to speed of 100Gbits per second.

Note: *Ethernet can be found at the bottom of the TCP/IP network stack (you can Google search this if you don't know what it is – think "network layers").*

Wi-Fi

Factors impacting the performance of Wi-Fi:

- Distance from WAP
- Objects in the way (e.g. thick walls)
- Interference from other neighbouring devices

How to improve Wi-Fi performance:
- Move closer to WAP
- Remove objects

- Use a signal booster
- Change channels to a clearer frequency/channel

Peer-peer vs client-server

Peer-to-peer means there is no powerful central server.

Benefits of peer-peer instead of client-server:

- Easier to set up because no server to configure
- Easier to add more devices (again less configuration time because no server)
- Simpler to maintain
- No need to have specialised training to set up a server
- If a network with few devices, absolutely no need for a server because you can easily install and upgrade software on a few devices, e.g. in a home network.

The cloud – what is it and advantages and disadvantages of using it.

Storing data in the cloud means storing them online (e.g. OneDrive or Dropbox).

Revise the **advantages** and **disadvantages** of this, there are many for each side!

The CPU – Describe the function of the main components.

For example:

- Control Unit
- ALU
- Cache
- Registers

Ethical, legal and cultural issues of IT and computing

Ethical = moral rights and wrongs

Legal = legislation/laws (e.g. copyright designs and patents act, computer misuse act, etc).

Cultural = impact of society/how people live, work and socialise

Note – Some of these may overlap!

The operating system

- Multitasking
- User interface
- Memory management
- Peripheral management
- Security

Utility programs:

- Defragmentation – arranges fragments files so that they are in contiguous (or sequential) order, because over time files will become fragmented. Putting the fragments back in order again will speed up the computer because the HDD will be able to access the files more quickly. It also puts al free space back in one block.
- Encryption
- Compression
- Backup/restore

Virtual memory

Concept of virtual memory is that it's a portion of the HDD reserved to behave as though it is RAM. So when the physical RAM fills up and you want to open another program, it will take a "snapshot" of the running programs and move some of them back to the HDD briefly. Then swap them back into RAM again when needed.

ROM (Read-Only Memory)

- Contains basic settings/instructions to boot up computer
- Contains the BIOS
- Contains settings that should not be changed

Embedded systems

Define embedded system

What exactly makes something an embedded system?

Examples of what makes an embedded system:

- Performs limited tasks or a specific function
- Is not general-purpose
- Maybe doesn't have an OS or a simplified OS
- Is inside a larger system
- Etc!

Note: *You need to be able to justify whether something is embedded or not.*

Not everyone agrees on exactly what makes something class as embedded!

Units of storage

Make sure you can convert between Gigabytes, Megabytes and Kilobytes.

- KB = 1024 Bytes
- MB = 1024 KB
- GB = 1024 MB

It's OK to approximate to 1000 instead of 1024!!!

E.g. what is 400,000 KB in GB? What is 3.4 GB in KB? Etc!

DNS and IP data packet structure

Domain Name System (DNS) – converts human-readable domain names into computer-readable IP addresses using domain name servers.

IP data packet structure (header and payload/data).

Examples of items of data contained in a data packet **header**:

- Source and destination IP address
- Checksum
  Google it and revise – an image of a data packet would be good! But make sure you find the GCSE level images!