Secondary Storage Revision – Optical Drives

Secondary storage is any **non-volatile** storage that can not be directly accessed by the CPU. This includes hard drives, CDs and DVDs and memory sticks. These can be inside the computer (such as a hard drive) or they can be removable.

Non-volatile means that the data remains stored when the computer is turned off.

Optical disks include CDs, DVDs and Blu-ray disks.
Each of these is read using a beam of light from a laser. This scans the disk and retrieves data. The surface of the disk is being changed so that light is reflected differently.

Q. Explain how an optical disk is read (4 marks):

- disk rotates (at high speed) - this means the tracking laser can get to all parts of the drive;
- the laser head moves across the radius of the disk;
- laser shines onto the disk;
- tiny indentations/pits/bumps reflect light differently (called lands and flats);
- reflected light is interpreted into 1s and 0s representing data stored on disk;
- data is stored on a single spiral track (like on a vinyl record and rather than a series of self-contained concentric tracks).

A little more detail:

For a 4 mark question you probably don't need this level of detail, but if you know it you'll be able to explain better

The disk is coated in a reflective alloy. Data is stored by creating pits in the surface of the disk – burning it using the laser. The pits are used to represent data: each start or end of a pit doesn't reflect light very well. When the laser shines on that section of the disk, light isn't reflected. On other sections light is reflected – so we have two possible values: 1 and 0.

Advantages of Optical Disks:

This understanding might come into a question where they provide two different computer setups and ask you to compare them

- established technology – people know what they're doing with disks. Particularly for gaming and video;
- very portable – disks can easily be removed and moved;
- cheap readers and very cheap read/write disks;
- easy to store disks;
- can be used effectively to backup away from the computer – security advantage.

Disadvantages of Optical Disks:

Blue Ray disks can store as much as 25GB, but that's tiny compared to a hard drive.

- disks can break or damaged;
- drives have moving parts so are more likely to fail;
- not all modern devices will be fitted with optical drives;
- relatively low storage space – CD disk is only 700MB