COMP2 Hardware devices homework

A computer system is made up of hardware and software.

Question 1

What is meant by:

1. Hardware (**1 mark**)

Hardware are the components of the computer that you can physically touch and interact with.

1. Software (**1 mark**)

Software are the programs and operating systems installed on the computer digitally that you can not physically touch.

Question 2

Give an example of:

1. an input device (**1 mark**) Keyboard
2. an output device (**1 mark**) Monitor
3. a storage device (**1 mark**) Hard Drive

Question 3

What is the function of the following components:

1. Processor (**1 mark**)

The processor fetches, executes and decodes instructions.

1. Main memory (**1 mark**)

The main memory is used to hold instructions and data while in use.

1. Secondary storage (**1 mark**)

Secondary storage is a portable storage area which permanently stores the operating system, system software, programs and data.

Question 4

The table below contains names of several computer system components. For each component, indicate with an ‘X’ whether it is hardware or software by

completing the table:

Component	Hardware	Software
Web browser		X
Main memory	X	
Operating System		X
Monitor	X	
Scanner	X	

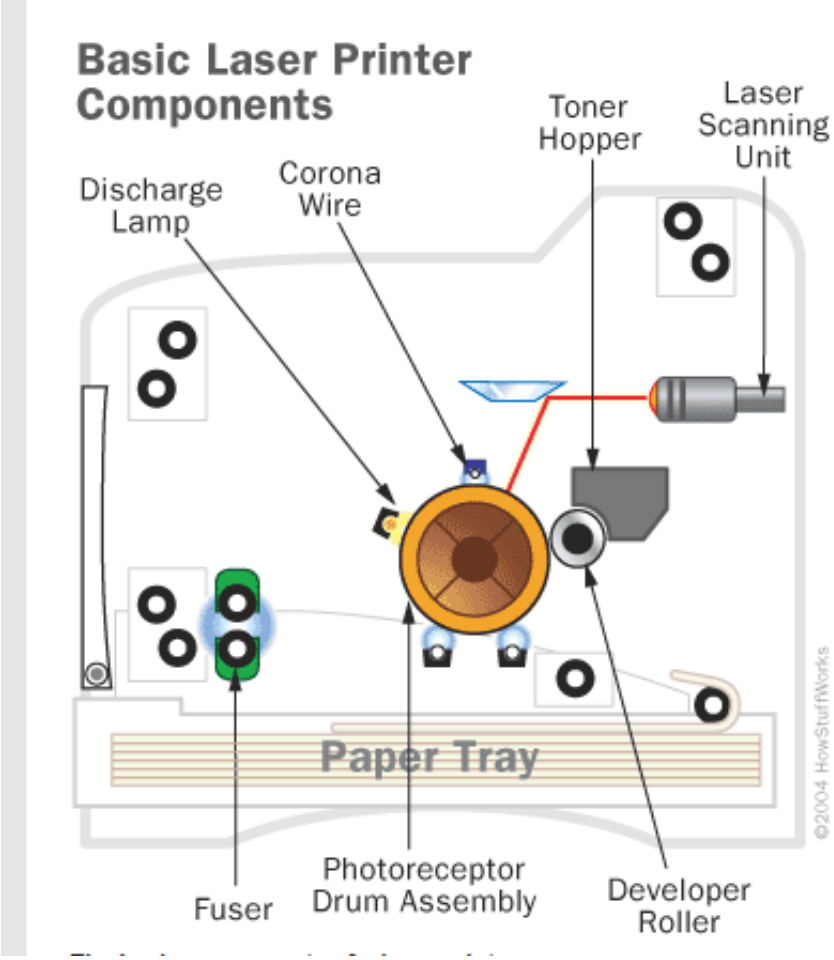
(**5 marks**)

Question 5

Research how each of the **printers** listed below works. Include the main principles of how it works as a bullet list, and include simple diagrams to illustrate relevant points. You should aim to have 8-12 bullet points about how each device operates.

1. Laser printer (**8 marks**)

- The primary principal at work in a laser printer is static electricity.
- The core component of a laser printer is the photoreceptor, typically a revolving drum or cylinder.
- This drum assembly is made out of highly photoconductive material that is discharged by light photons.
- Initially, the drum is given a total positive charge by the charge corona wire, a wire with an electrical current running through it.
- As the drum revolves, the printer shines a tiny laser beam across the surface to discharge certain points. In this way, the laser draws the letters and images to be printed as a pattern of electrical charges.
- The system can also work with the charges reversed - a positive electrostatic image on a negative background.
- After the pattern is set, the printer coats the drum with a layer of toner, or black powder, which only sticks tro the negatively charged areas, not the positively charged background.
- The drum rolls over a sheet of paper, which is moving along a belt below.
- Before the paper rolls under the drum it is given a negative charge by the transfer corona wire.
- The negative charge is stronger than that of the electrostatic image, so it can pull the toner powder away exactly how it was on the drum, as it moves at the same speed.
- To prevent the paper from sticking to the drum, it is discharged by the detac corona wire immediately after picking up the toner.
- Finally, the printer passes the paper through the fuser, a pair of heated rollers. As the paper passes through these rollers, the loose toner powder melts, fusing with the fibers in the paper. The fuser rolls the paper to the output tray, and you have your finished page.

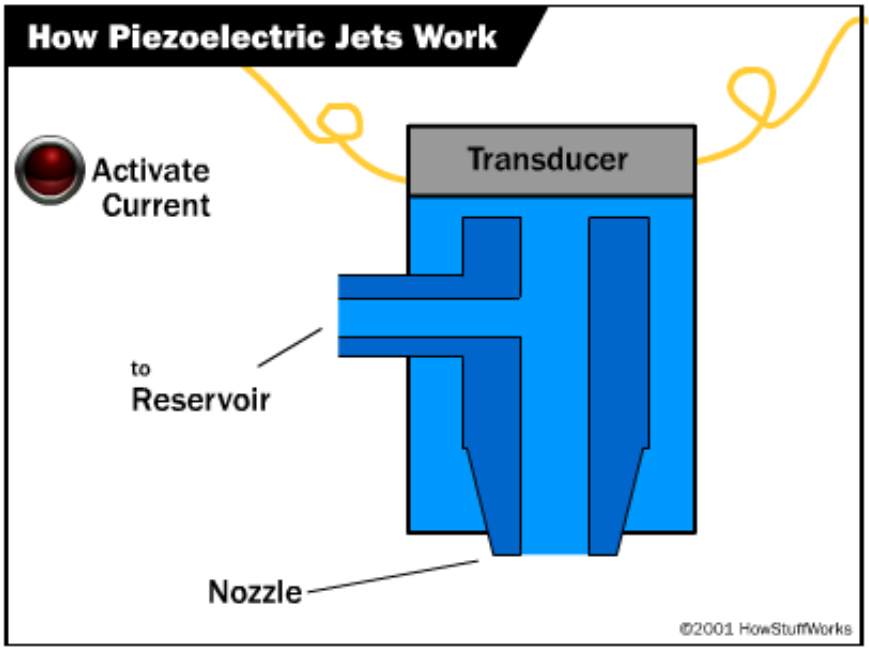


1. Inkjet printer (**8 marks**)

- Inkjet printers put an image on paper using tiny jets of ink.
- Inkjet printers have improved in popularity and performance over the years, and dropped in price as well.
- They put tiny dots of ink, about 50 - 60 microns in diameter each, onto the paper to create the image.
- The dots are positioned very precisely, with resolutions of up to 1440x720 dots per inch.
- The dots can have thousands of different colour combinations to create photo qualioty images.
- The core of an inkjet printer is the print head, which contains a series of nozzles used to spray drops of ink.
- Inkjet printers use ink cartridges, which come in various different colours, like black and white, or a mix of blue, yellow, and red to make any colour required.
- The print head stepper motor moves the print head assembly back and forth across the paper.
- A belt is used to attach the print head assembly to the stepper motor, and the print head assembly uses a stabilizer bar to make sure its movements are precise.
- The paper is put in the paper tray feeder, and rollers pull the paper from the tray feeder into the printer, where the images are printed, and the rollers are also capable of turning the paper over for double sided printing. They make sure the paper is positioned correctly, and then output the finished copy.
- There are two different main inkjet technologies used at the moment:

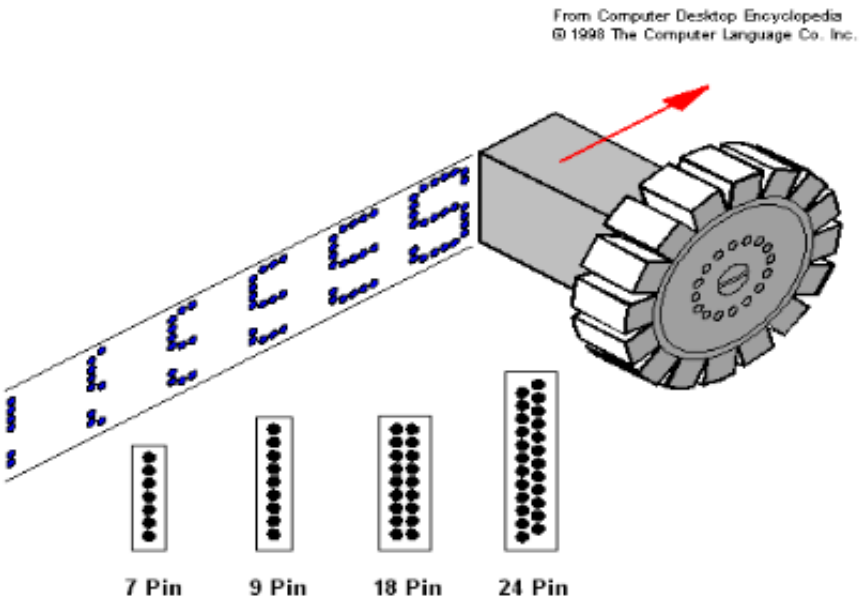
Thermal bubble and piezoelectric.

- In a thermal inkjet printer, tiny resistors create heat, and this heat vaporizes ink to create a bubble. As the bubble expands, some of the ink is pushed out of a nozzle onto the paper.
- In a piezoelectric printer, a crystal is located at the back of the ink reservoir of each nozzle. The crystal receives a tiny electric charge that causes it to vibrate. When the crystal vibrates inward, it forces a tiny amount of ink out of the nozzle. When it vibrates out, it pulls some more ink into the reservoir to replace the ink sprayed out.



1. Impact printer (**8 marks**)

- Impact printers physically hit the paper. They are one of the earlist types of hard copy output.
- There are three primary types of impact printer: dot-matrix printer, daisy wheel printer, and line printer.
- The dot-matrix printer prints one character at a time using an adjustable-pin print head.
- Daisy wheel printers have every printable character on a wheel which is spun round until the appropriate character is above the paper, then strikes the paper.
- Line printers print an entire line of text at once, rather than one character at a time.
- Impact printers use magnets to operate their movable print heads.
- When the printer receives data, a logic board on the printer interprets the data and generates a series of electrical impulses. These impulses travel to the print head, where an electromagnet converts them to physical movement of a print head.
- They also use an ink covered ribbon between the print head and the paper, to augment the printing quality and leave a more readavble mark on the paper. Otherwise the impact would not be strong enough to leave permanent, readable text on a printing surface.



Total 37 marks