DATA OUTPUT DEVICES:

I. Soft-copies

(i) *The screen*: Currently there are two types of visual display units (VDU) available. These help in displaying what we have entered into the computer, as well as the output that is derived from the computer after a process. When one has to see uptodate positions etc. these are good. These are also now popular for demonstrations and presentations.

(a) **CRT** – Cathode Ray Tube, which comes in monochrome, soft white and colour forms. These are normally used with Desktop computers.

(b) **LCD** – Liquid Crystal Display, also in soft white and colour. These are sleek and mostly used in portable computers, viz. palm-tops and laptops. On the same lines there are LCD overhead projectors, which when interfaced with the computer the output could be projected on to a screen in a larger form for a convenient viewing in meetings, demonstrations and presentations.

(ii) *Storage devices*; the data or processed information generated by a computer could be stored permanently and could be retrieved back by a computer. The information is stored in the form of files and these are called soft copies. These can't be read without the help of a computer and also normally without the relevant software through which they were created. These devices were discussed before.

II. Hard copies: The output generated on a paper or permanently readable media is called the "hard copy".

(1) **Printers**:

(i) *Impact printers*: These printers physically touch the paper and make the impression on it, hence these are called impact printers. These are very noisy printers.

(a) *Dot Matrix Printer*: These are versatile and fast printers. They can print graphs, Tabulated output, pictures, drawings and documents. Their speed is measured in terms of pages per minute. The printer head is made of pins arranged in the form of a matrix. Each pin has a movement, these pins move

according to the internal messages from the computer and strike on the paper through a ribbon, thus making impression on the paper. The quality of print comes from the density of the pins in the matrix, it is measured in terms of dots per inch (dpi).

(b)

(c) *Dairy wheel / Golf ball printer*: A small Daisy like structure / golf ball like structure the fonts forming characters are embossed. The wheel / ball rotates at a speed and a hammer hits the wheel or ball, based on the instruction from the computer, when a particular character is on the side of the paper, which in turn hits a ribbon which makes the character print on the paper. The print out is called a letter- quality printout, since complete characters are printed, unlike dots in a dot matrix printer. These can not print graphs etc.

(d) *Plotter*: This is a type of printer that is very popular with draftsmen etc. A small arm like part holding a pen moves on a paper and actually writes on the paper. It has option of colour pens (three to four) placed at a particular position, from which the arm picks up the pens according to the message received from the computer. This also is a versatile printer, but it is very slow.

(e) *Line Printer*: It is a high speed, letter quality printer. The fonts in this are embossed on a big band and normally touched up with a thin platinum tip for longer life. This band rotates at a very high speed and the hammer placed on the back of it hits on the band at the position and gives a print through a ribbon on the paper. This is used where large chunks of data have to be printed very frequently, like the Railway passenger list placed on the trains and notice boards.

(ii) *Non-impact printers*: In these printers the print head does not physically touch the paper, but makes impression on the paper by different techniques viz. heat, light and liquid. All these are versatile, high-speed letter quality printers that work almost silently.

a. *Laser pinter*: These work using laser beam. The tiny rays are beamed on the paper and they make impression.

b. *Ink-jet/ bubble-jet printer*: Ink, black or coloured (upto 3 colours),, their combination in turn makes different shades and colours are sprayed or small bubbles are burst on to the paper creating characters on it.

c. *Thermal printer*: This works on tiny heat rays. It sort of burns the paper, not literally, and makes characters in the pattern of the generated heat rays