Bidita

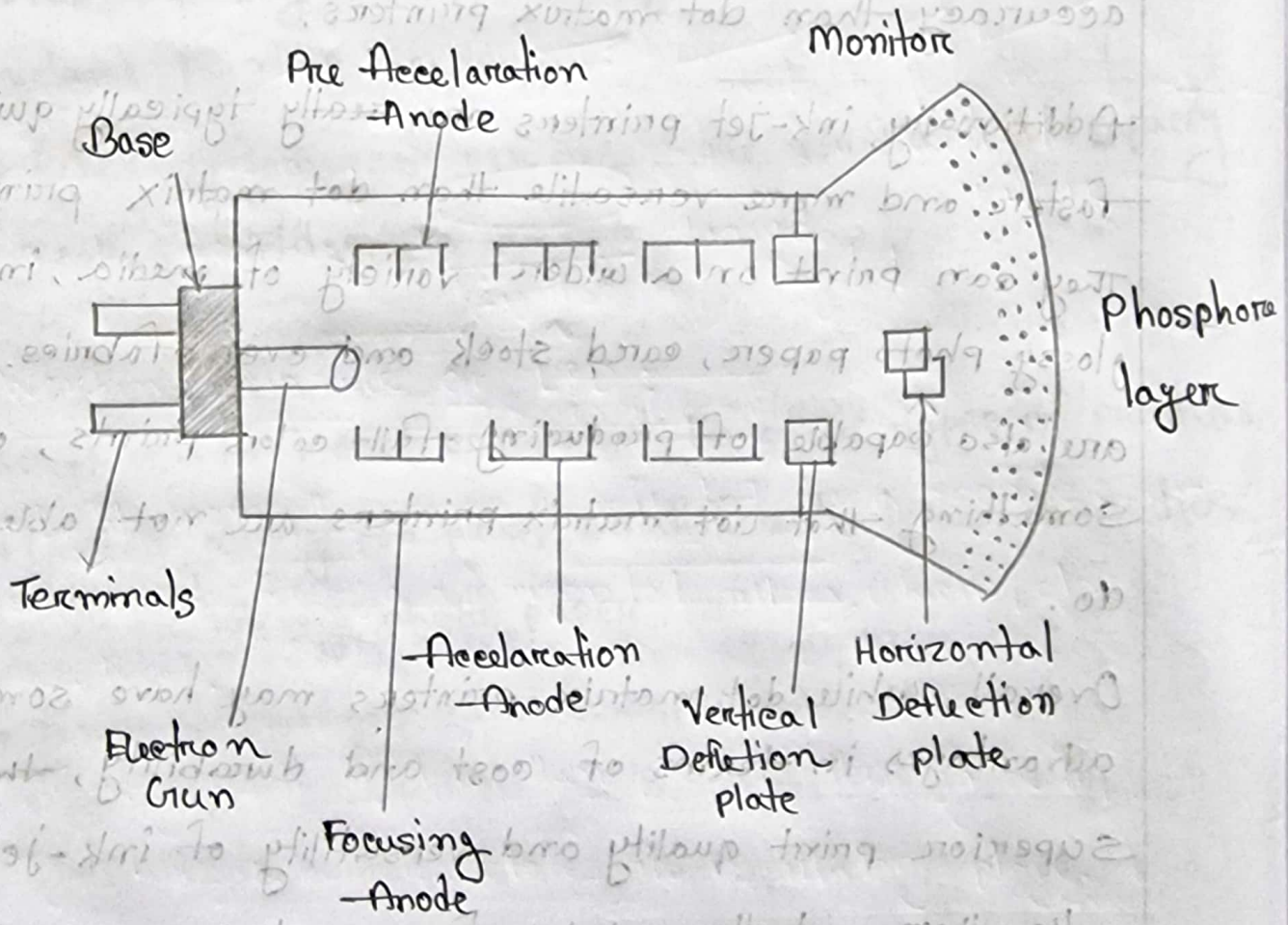
Output Device
Monitor

* Monitor?

⇒ There are three types of monitor:

1. CRT
2. LCD
3. LED

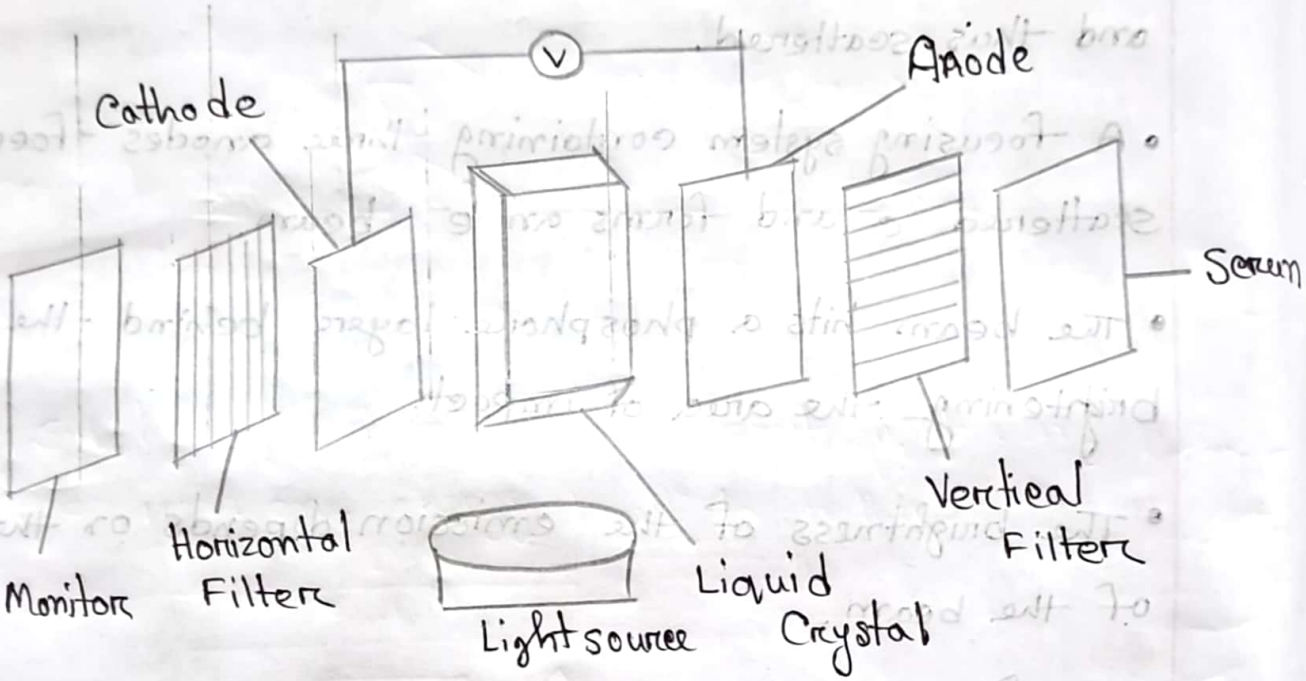
* CRT → Cathode Ray tube monitor



Working principle of CRT :

- When power is applied to the terminals, the e^- gun emits electrons, which are repelled from each other and thus scattered.
- A focusing system containing three anodes focuses the scattered e^- and forms an e^- beam.
- The beam hits a phosphore layer behind the screens brightening the area of impact.
- The brightness of the emission depends on the speed of the beam.
- To form a complete picture, the beam needs to be moved accross the screen, which is achieved by horizontal and vertical deflection plate.
- This movement is known as scanning.
- Two types of scan : Raster scan, Vector Scan.
- In order to produce color image, three types of phosphore are used for each of RGB channel.

* LCD → Liquid Crystal Display Monitor



Working principle of LCD :

- Light from the source is reflected by a monitor and is passed through a horizontal filter, which polarizes the light.
- The polarized light is then passed through a liquid crystal layer which rotates its oscillatory plane.
- The angle of rotation is controlled by a set of anode and cathode.

- The rotated light then reaches a vertical filter.
- The vertical filter allows the tangent of the light to pass.
- Thus the screen is enlightened with a certain brightness.
- This is how a single pixel works.
- Millions of pixels are arranged in an array to form the display.
- To show color, three of these mechanisms, showing RGB colors, are arranged for each pixel.

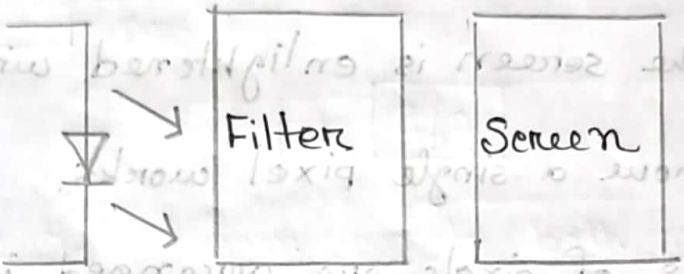
* **Why not LCD?**

⇒ A single light source is used for lightening up all the pixels. The rotation of crystals cannot block the entire light going from the source to the screen when a pixel is needed to be shown as black. Hence it cannot produce a completely black/dark pixel.

* **Solution of LCD is LED (Light Emitting Diode monitor)**

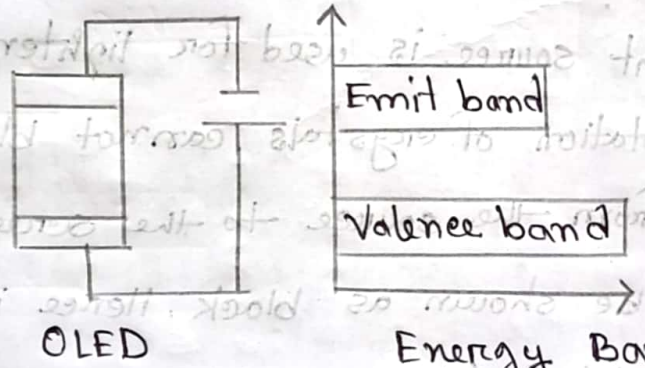
⇒ The way of getting a complete black pixel may be to use a single light source, namely an LED, for each pixel fabrication of so many small LEDs at the scale of

pixel size is impossible. The solution to this problem is using organic LEDs.



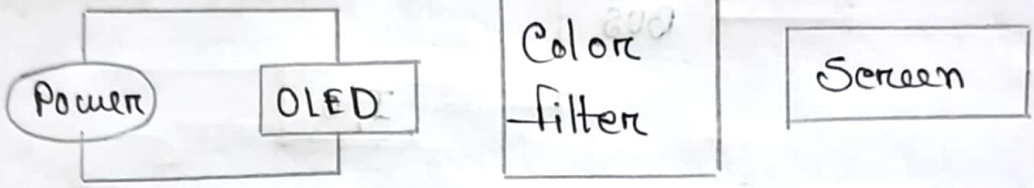
* Organic LED (OLED)

⇒ Substance used in OLED can emit light using jumping of e^- from one energy band to another.



Applying certain voltage from the battery forces the e^- in the substance to jump to Emit energy band later, the e^- jumps back to its original energy band, emitting light of certain intensity. The amount

* of intensity can be controlled from the power source. So, no filter is required.



OLED Pixel

Three color filters and three OLEDs per pixel can be used for color displays.