

## lab-2- Spectrophotometer

### First stage /Nursing

## Spectrophotometer

Spectrophotometer is an instrument that measures the amount of photons (the intensity of light) absorbed after it passes through sample solution. With the spectrophotometer, the amount of a known chemical substance (concentrations) can also be determined by measuring the intensity of light detected. depending on the range of wavelength of light source, it can be classified into two different types:

- UV-visible spectrophotometer: uses light over the ultraviolet range (180-400 nm) and visible range (400-750 nm) of electromagnetic radiation spectrum.
- IR-spectrophotometer: uses light over the infrared range (750 - 15000 nm) of electromagnetic radiation spectrum.

## Components of Spectrophotometer

**1-Light source:-** there are three different sources of light are commonly used to produce light of different wavelength. The most common source of light used for the visible spectrum is a tungsten lamp. For Ultraviolet radiation, commonly used sources of are the hydrogen lamp and the deuterium lamp. Nernst filament or global is the most sources of IR (Infrared) radiation.

**2-Collimator** – a collimator consist of a curved mirror or lens . This can be used to replicate a target focused to make collimated light or parallel rays.

**3-Monochromator** – To select the particular wavelength, prism or diffraction grating is used to split the light from the light source.

4. **Sample holder** – Test tube or Cuvettes are used to hold the colored solutions. They are made up of plastic or glass or Quartz at a visible wavelength.

5. **Detector** – When light falls on the detector system, an electric current is generated that reflects the galvanometer reading.

6. **Recorder** – The current from the detector is fed to the measuring device, the galvanometer. The meter reading is directly proportional to the intensity of light.

### **Blank solution and Standard solution**

**Blank solution**– is a solution containing all the solution component except the one substance that interested, usually used to calibrate instruments such as a colorimeter. to use blank solution in spectrophotometer we have to adjust the meter needle of transmittance to (100 xT) and the absorption will be 0.

**Standard solution** –is a solution containing a known concentration of an element or a substance. the standard solution are used to determine the concentrations of other substances.



**Figure(1):Spectrophotometer**



# Spectrophotometer

Principle, Instrumentation, Applications

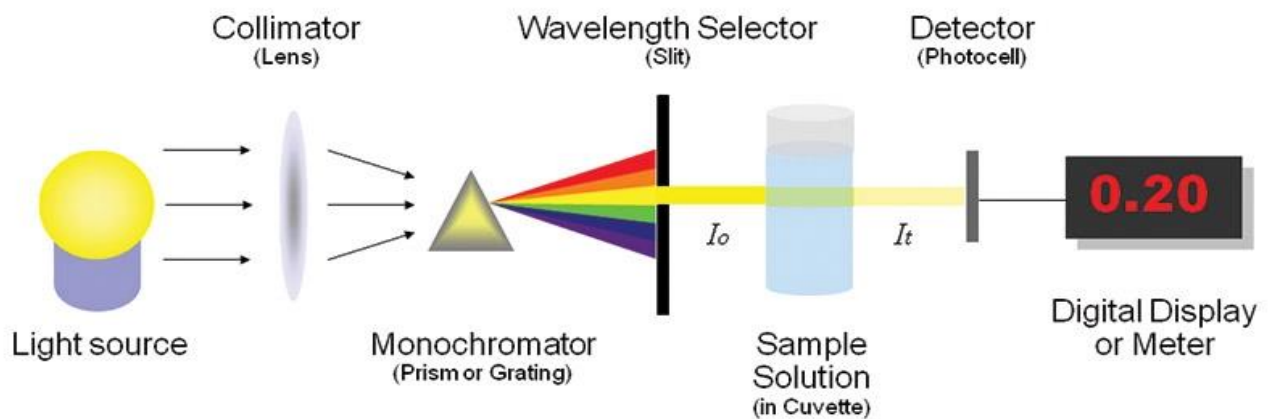


Figure (2): Component of Spectrophotometer