

Filter Photometer:

A colorimeter or filter-photometer is used for measuring transmittance and absorbance of solutions. Following figure shows the principle of a colorimeter.

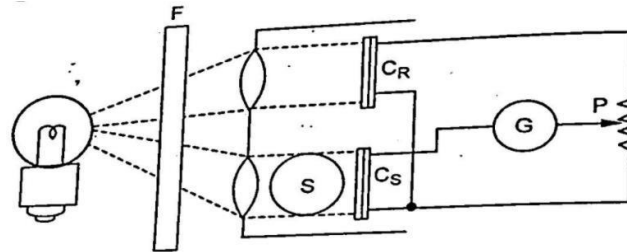


Fig: Colorimeter (Filter Photometer)

A filter F selects a suitable wavelength large from the light of a lamp. This light falls on two photoelectric cells, Reference cell C_R and Sample cell C_S .

Without a sample, the output of both cells is the same. When a sample is placed in the light path for the sample cell, its output is reduced and the output of C_R has to be divided by a potentiometer P until a galvanometer (G) shows a balance. The potentiometer can be calibrated in transmittance or absorbance units over a range of 1 to 100 percent transmittance corresponding to 2 to 0 absorbance units.

Flame Photometer:

A flame photometer is used to determine the concentration of sodium (Na), Potassium (K) and calcium (Ca). Lithium is used as a calibration substance in the analysis.

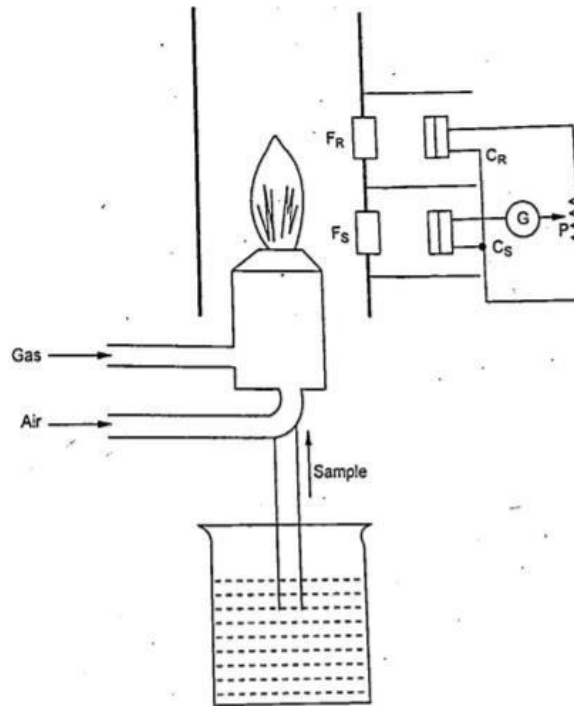


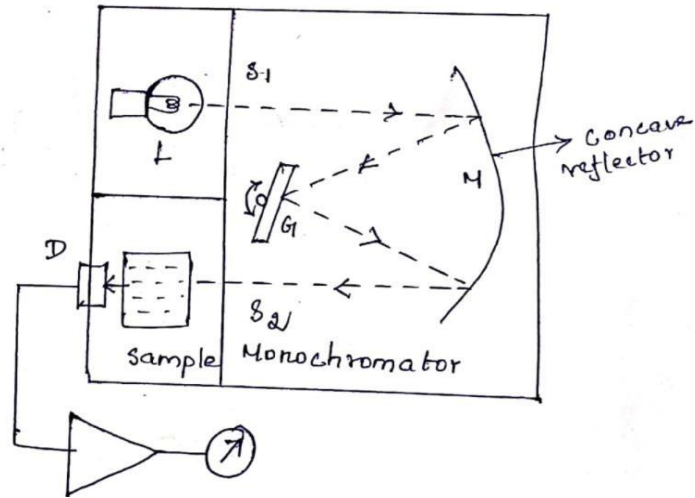
Fig: Flame Photometer

A colourless flame appears yellow for sodium and violet for potassium when their solutions are aspirated into the flame. Flame photometer is used in the analysis of blood or urine. A few drops of sample is aspirated into a glass flame that burns in a chimney, And a known amount of lithium salt is added to the sample, thus causing a red flame.

Filters are used to separate the red light produced by the lithium from the yellow or violet light emitted by the sodium or potassium. As in the colorimeter, the output from the sample cell C_S is compared with a fraction of the output from a reference cell C_R . Finally, the balance potentiometer P is calibrated directly in units of sodium or potassium concentration.

Spectro Photometer:

The blood serum is a complex fluid that contains a large amount of chemical substances dissolved in it. These substances have the property of absorbing emitting visible light. The nature of these substances can be analysed by analysing their absorbing and transmittance characteristics. Thus, the protein and iron levels in the blood can be measured with the help of photometer.



The figure shows the spectrophotometer here the light from a halogen lamp is passed through a entrance slit S_1 and incident on a concave reflector which focuses the light on a diffraction grating 'G'. The dispersed light from the grating directed on the reflector. From the reflector the light beam is directed to the sample through a narrow exit slit S_2 . Photodetector detects the light and gives an electrical output corresponding to the intensity of the transmitted light.

The amplifier amplifies the output from the detector and finally the indicator indicates the concentration of the substance. By rotating the grating, the measurements can be made at different wavelengths.