

# **BIOINSTRUMENTATION**

**22Z00VC19**

# UNIT-1

## BIOINSTRUMENTATION

Bioinstrumentation is used in space mainly to monitor the health status of the crew and for research purposes.

### INSIGHTS

- Provides detailed insights into a variety of biomedical instruments for use in different medical areas such as radiology, cardiology and physiotherapy
- Equips researchers with an understanding of the working principles of various instruments, thus preparing them for the future development and design of innovative devices in the health domain
- Contains various mathematical derivations and numerical data that connect theory with the practical environment

# The Metric System

**mega-** 10,000

**kilo-** 1,000

**hect-** 100

**deca-** 10

**liter, meter, gram-** 1

**deci-** .1

**centi-** .01

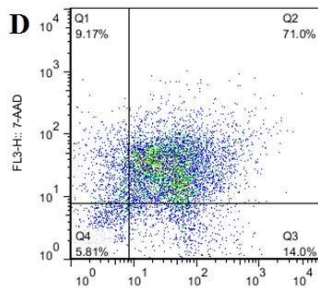
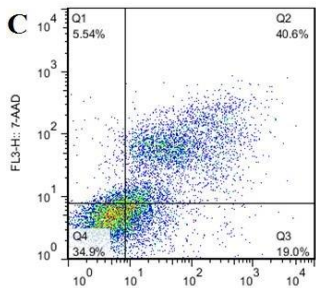
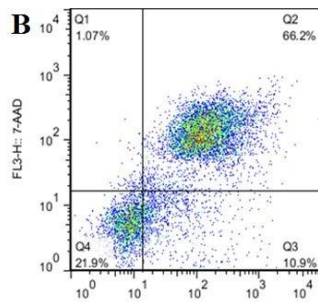
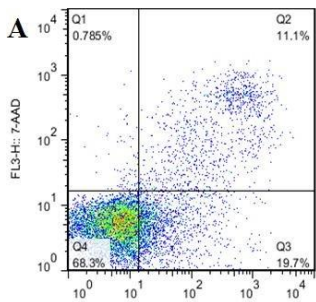
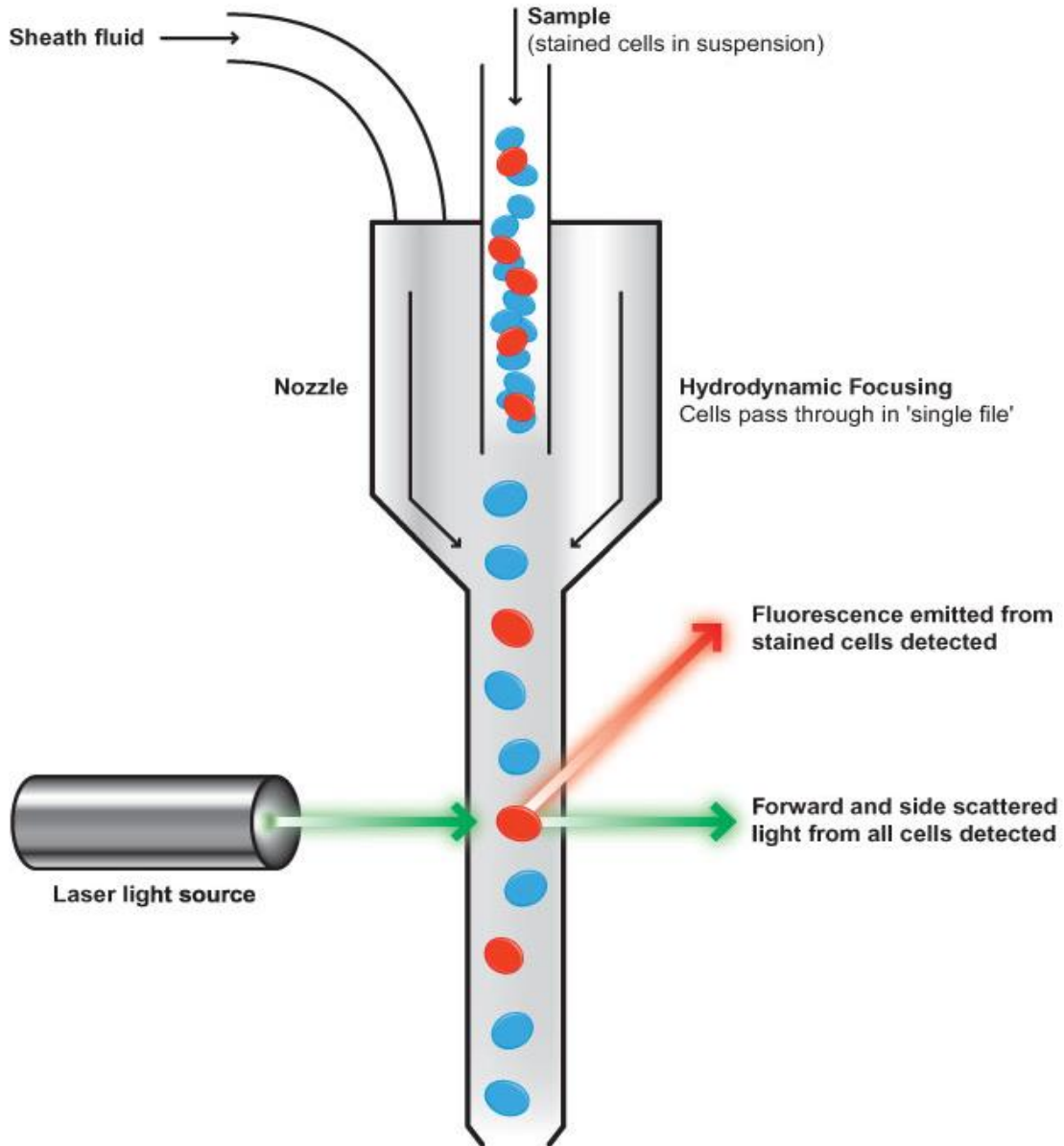
**milli-** .001

**micro-** .0001

## UNIT METRIC CONVERSION CHART

Prefix	Abbr.	Exponential Factor	Conversion Factor	(Multiply by)
tera	T	$10^{12}$	1 000 000 000 000	a trillion
giga	G	$10^9$	1 000 000 000	a billion
mega	M	$10^6$	1 000 000	a million
kilo	k	$10^3$	1 000	a thousand
hecta	h	$10^2$	100	a hundred
deka	da	$10^1$	10	a ten
—	—	$10^0$	1	a unit
deci	d	$10^{-1}$	0.1	a tenth
centi	c	$10^{-2}$	0.01	a hundredth
milli	m	$10^{-3}$	0.001	a thousandth
micro		$10^{-6}$	0.000 001	a millionth
nano	n	$10^{-9}$	0.000 000 001	a billionth
pico	p	$10^{-12}$	0.000 000 000 001	a a trillionth

# FLOW CYTOMETRY

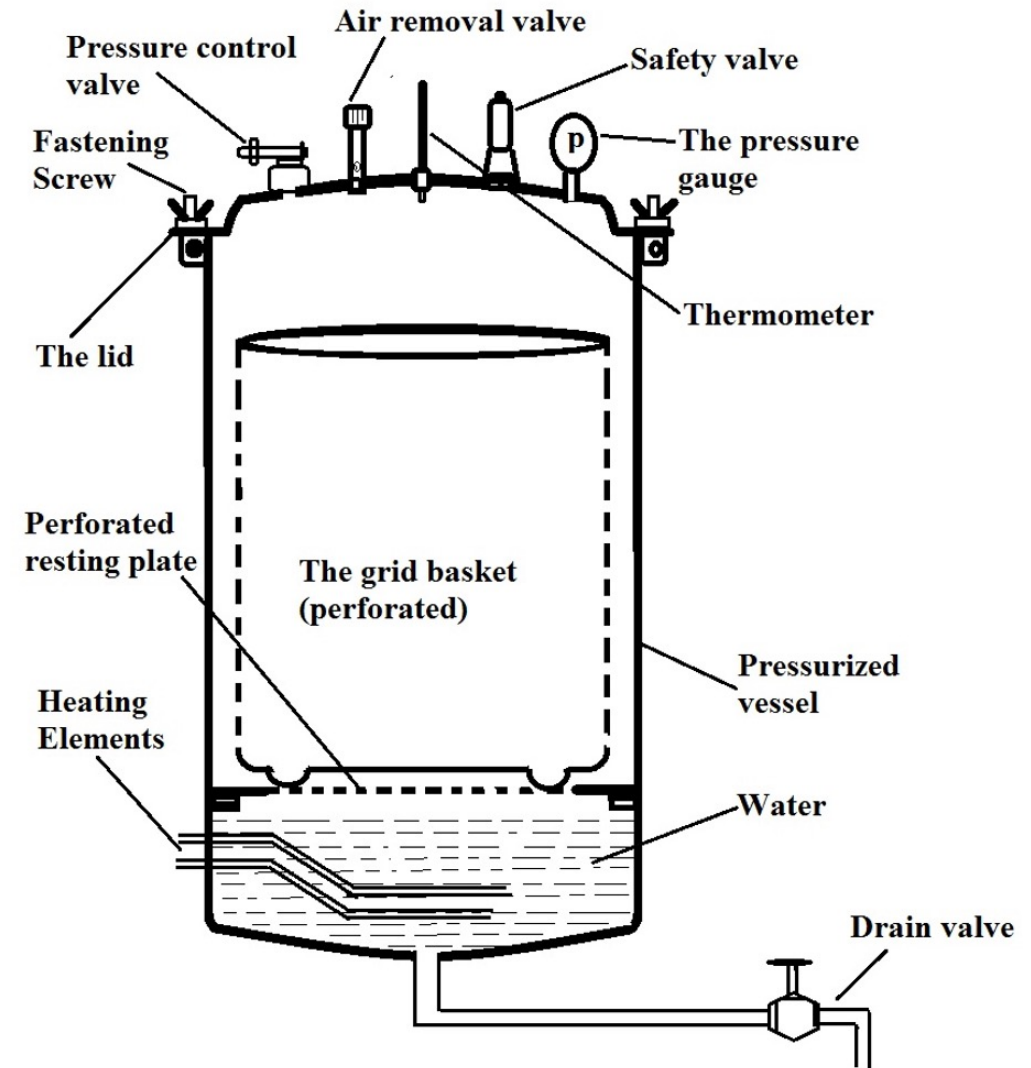


FL2-H: PE Annexin V

FL2-H: PE Annexin V

# UNIT-II

## AUTOCLAVE

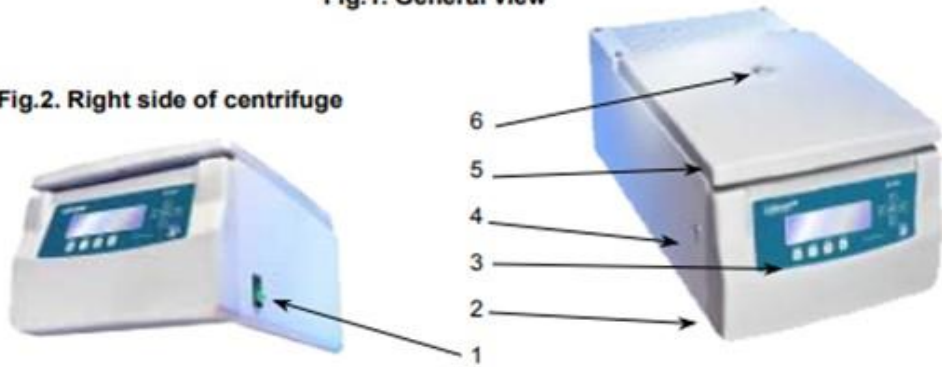


# CENTRIFUGE

1

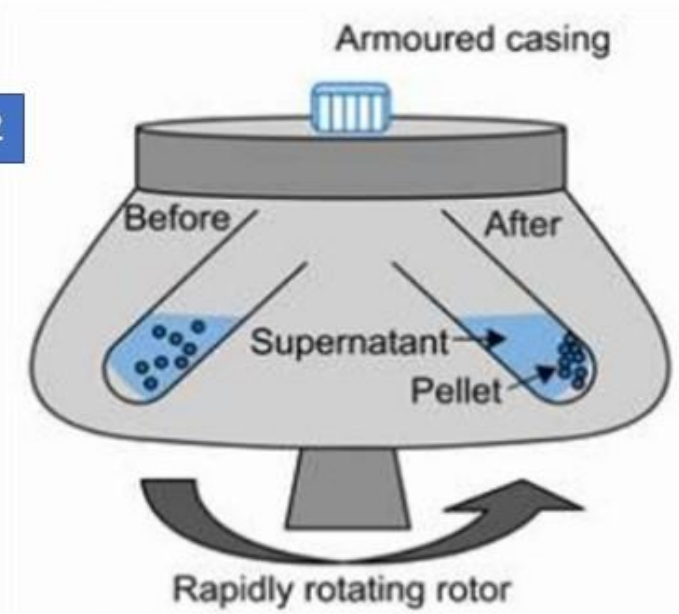
Fig.1. General view

Fig.2. Right side of centrifuge



1. Power switch
2. USB
3. Control panel
4. Point of emergency lid opening
5. Lid
6. Inspection glass

2



3

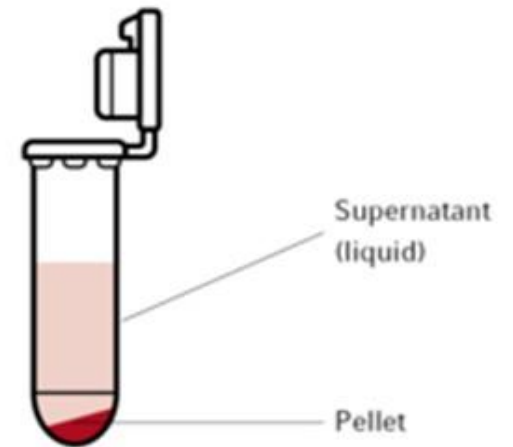
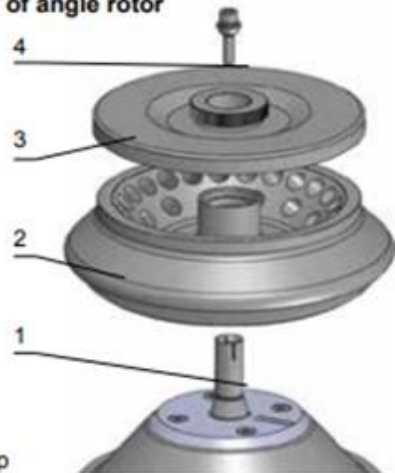


Fig.3. Assembly of angle rotor



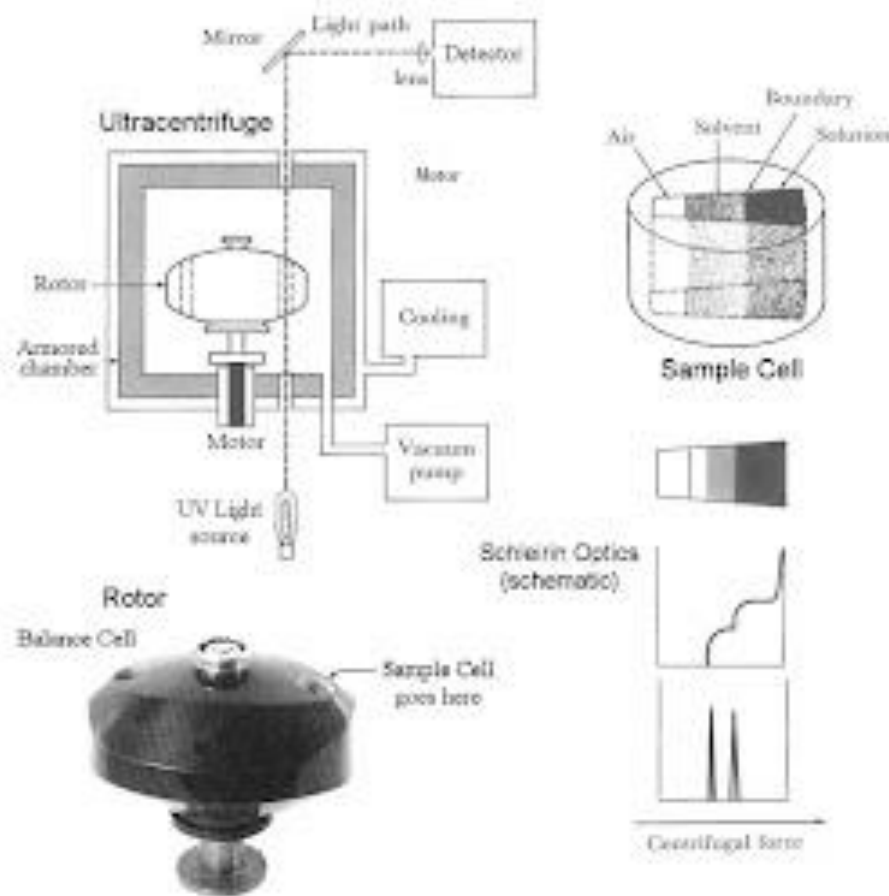
1. Motor axle
2. Rotor
3. Rotor lid
4. Complete clamp

Fig.4. Mains socket back of the centrifuge

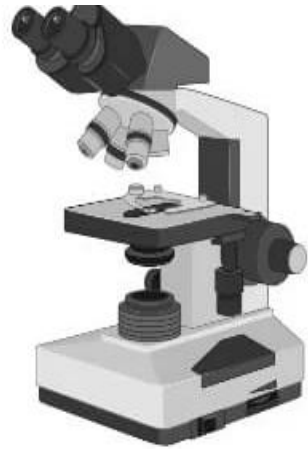
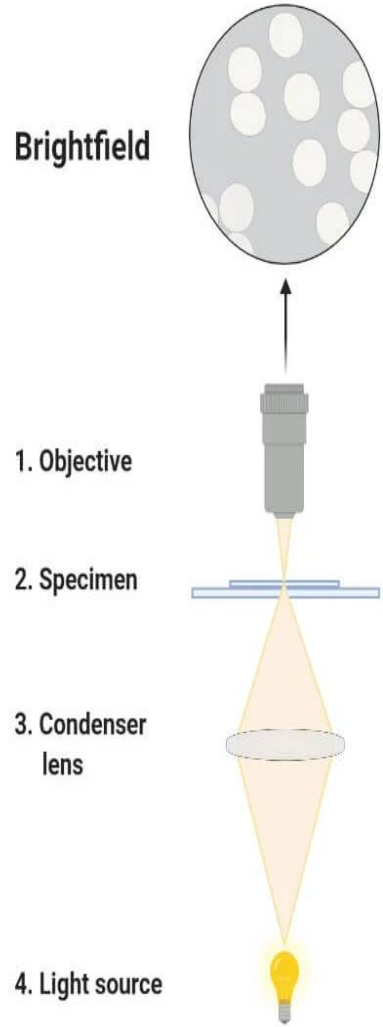


1. Main socket
2. Fuse socket

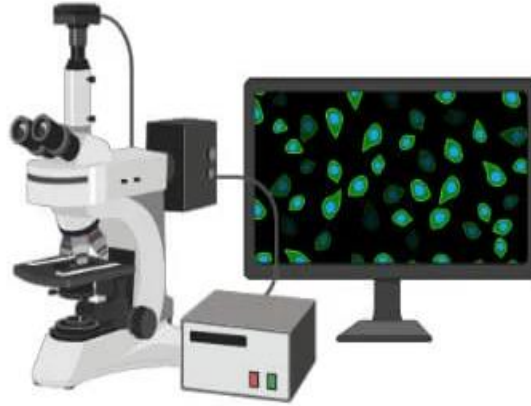
# ULTRACENTRIFUGE



# UNIT III



**Light Microscope**



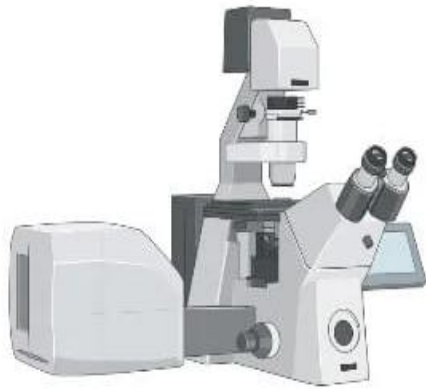
**Fluorescence Microscope**



**Electron Microscope**



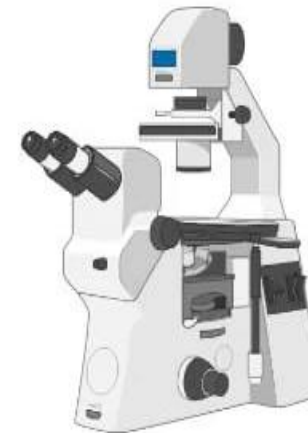
**Stereo Microscope**



**Confocal Microscope**



**Atomic Force Microscope**



**Inverted Microscope**



**Retinal Imaging Microscope**

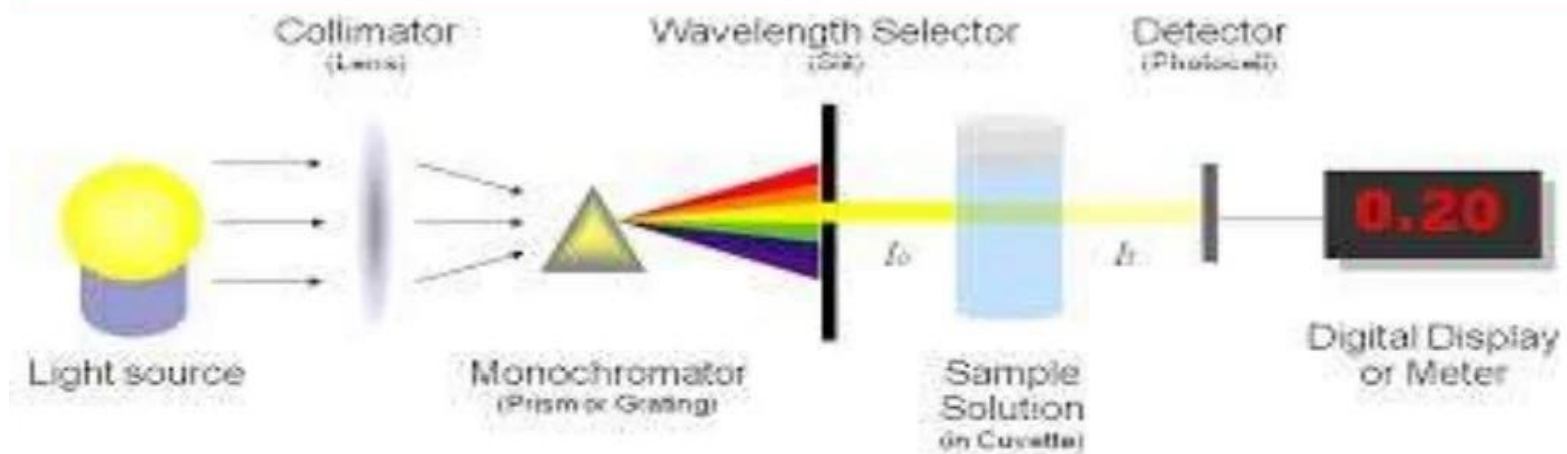


# UNIT-IV

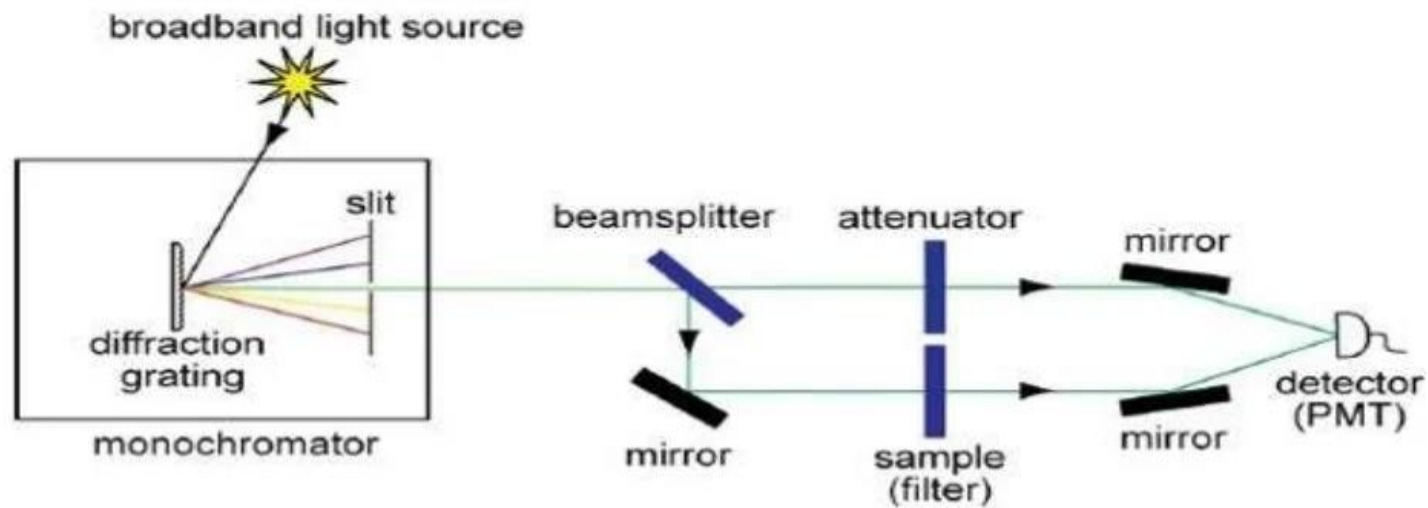
## SPECTROSCOPY



### SINGLE BEAM SPECTROPHOTOMETER



### DOUBLE BEAM SPECTROPHOTOMETER

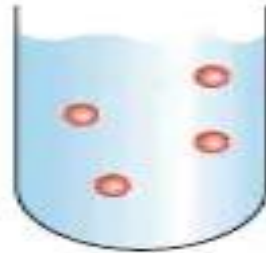


# RADIOIMMUNO ASSAY

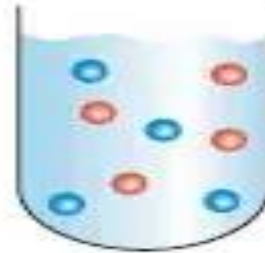
RIA Diagram



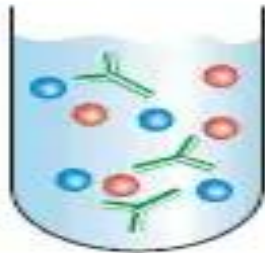
Step 1. Add buffer to the tubes.



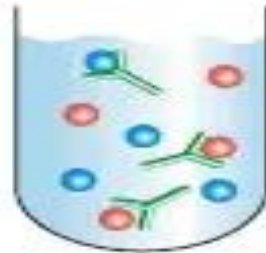
Step 2. Add known amounts of unlabeled antigen to the mixture. These compete for the binding sites of the antibodies.



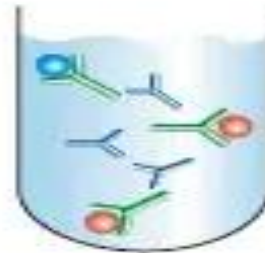
Step 3. Add radioactive antigen to the mixture.



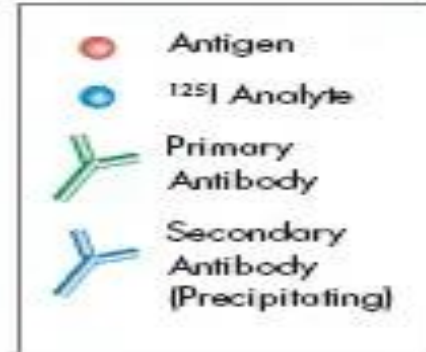
Step 4. Add fixed amount of antibody to the tubes.



Step 5. Radioactive antigen is displaced from the antibody molecules by the unlabeled antigen. Precipitate ag-ab complexes with PEG secondary antibody.



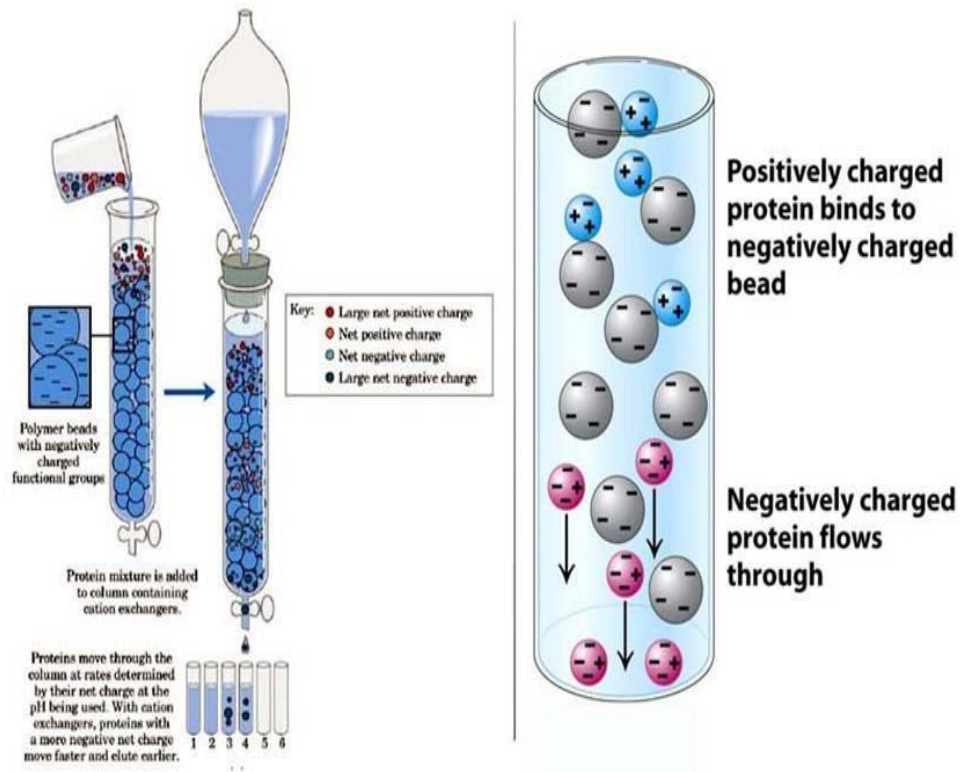
Step 6. The antibody-bound antigen is separated from the free antigen in the supernatant fluid and the radioactivity of each is measured.



From the data, a standard binding curve can be drawn. The samples to be assayed (the unknowns) are run in parallel. After determining the ratio of bound to free antigen in each unknown, the antigen concentrations can be read directly from the standard curve.

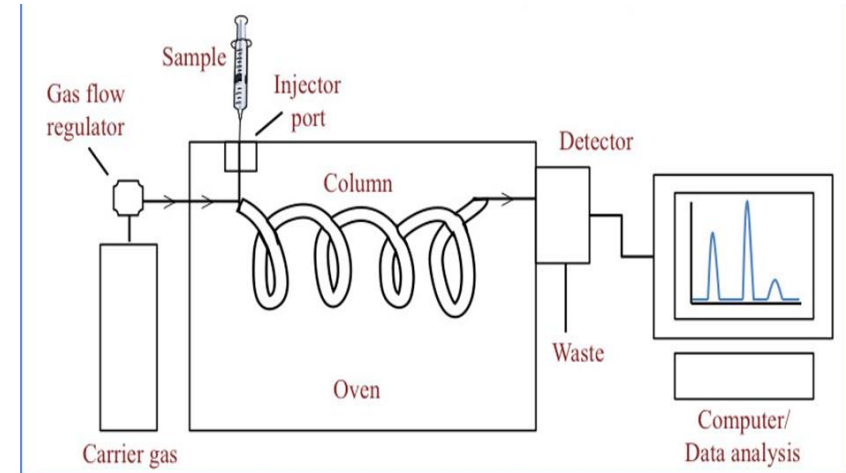
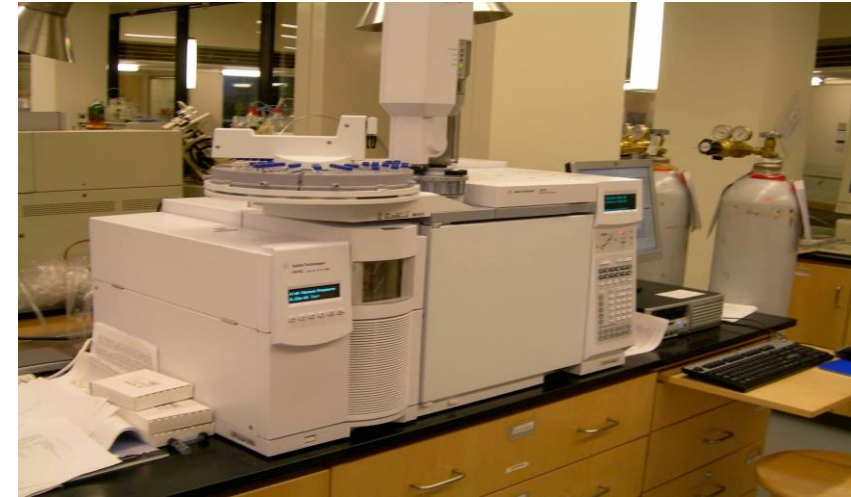
# UNIT-V

## Ion Exchange Chromatography Principle



[www.technologyinscience.blogspot.com](http://www.technologyinscience.blogspot.com)

## GAS CHROMATOGRAPHY



# High Performance Liquid Chromatography (HPLC)

