

Radio Isotopes it's applications

Ch 1 :-

- Introduction – Isotopes
- Radio isotopes source
- Absorbing Doscand Units of Radiation
- Type of Radiation :-
 - A – charged Nuclear Particles
 - B – Electromagnetic Radiation
 - C – Neutron
 - D – characterization of neutron
- Type of Decay :-
 - A – Decay
 - B – β - Decay
 - C – Proton Decay
 - D – neutron Decay
 - E – Positron Decay
- Pair Production
- Absorption of Gamma Rays
- Definitions :-
 1. masses
 2. charges
 3. Dimensions
 4. Density of nucleues
 5. Forces
- Cross section

Ch 2 :-

- Radioactivity
 - Natural Radioactivity
 1. The Radioactive Decay law
 2. Radioactive of sample
 3. Half life time and mean life time ($t_{1/2}$,T)
 - Artificially produced Radionuclides
 - Units of Radioactivity

Ch 3 :-

- Nuclear – Particles reactions with matter :-
 1. charged particles :- (1. Range of charged particles 2. Specific ionization and stopping power) .

2. Electrons (determination electron range from absorption curve).
3. Law of absorption
4. γ - ray (absorption γ - ray from matter)
 - Decay α and β with γ - ray
 - Stopping of neutrons (Fast neutrons , slow neutrons) .

Ch 4 :- Nuclear detectors

- motion of electrons and Ions In gas
- Gas- Filled counters
- Ionization chamber
- Ionization chamber for neutrons
- Proportional counters
- Geiger – Mueller counter
- Scintillation counter and applications
- The solid – state Counters

Ch 5 :-

- Principles of radiation and detection
 - Principles Rules to uses Radio isotopes in industry
 - Principles of Radiotracer Technique
 - Fluid properties
 - Flow Rate Measurement
1. Peak-to-Peak Method
 2. Dilution Method
 3. Total- count Method
 4. on – the- spot activation Method
 5. Activation analysis Method
 - Flow pattern study
 - Leakage Investigation
 - Process characteristics
1. Homogeneous Mixing
 2. Residence Time