

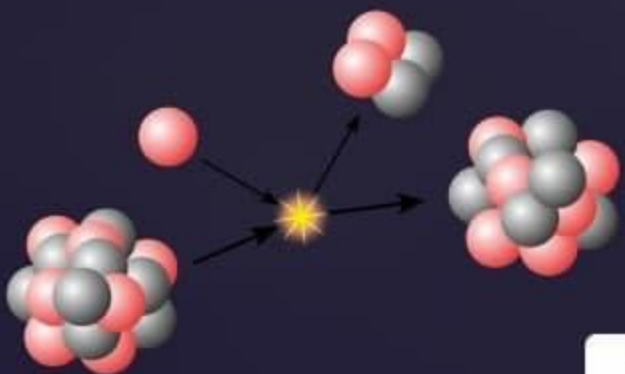


Mahendra's

WEEKEND SPECIAL

GS

RADIOACTIVITY



LIVE

23 JAN

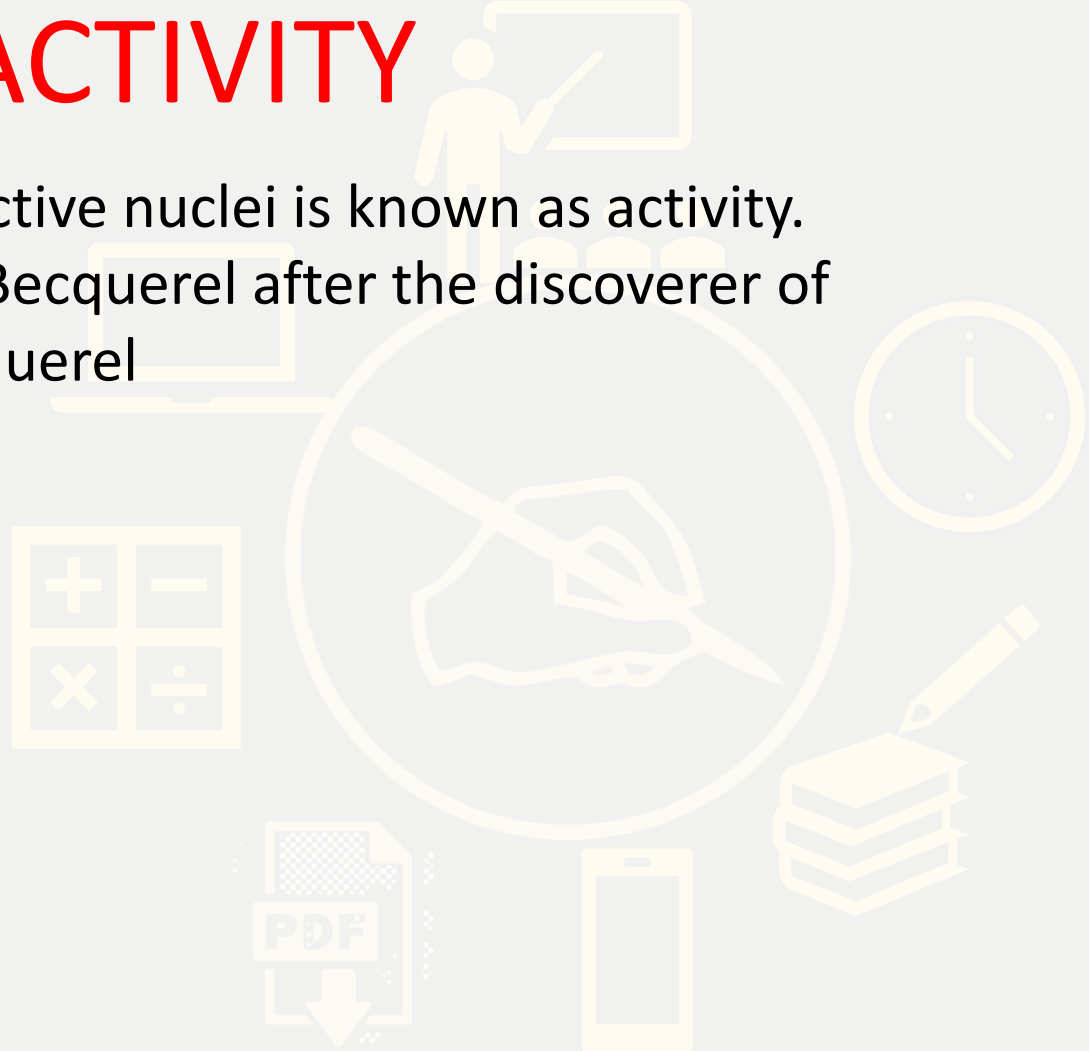
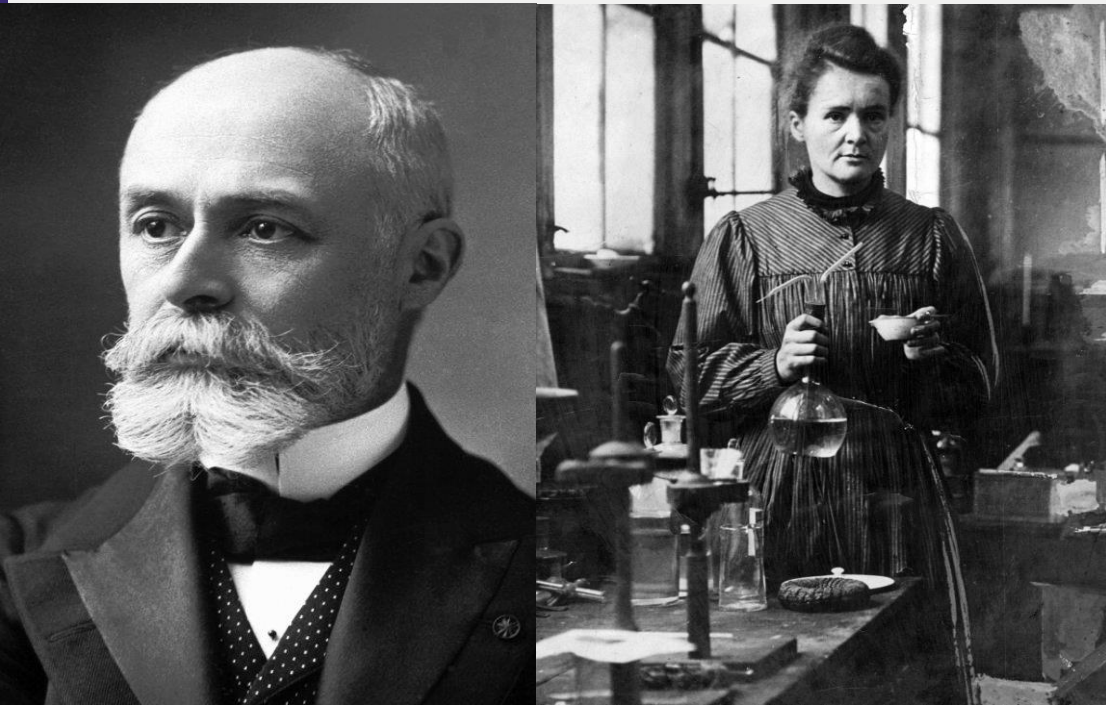
10:15 AM





RADIOACTIVITY

1. The decay rate of radioactive nuclei is known as activity.
2. The SI unit of Activity is Becquerel after the discoverer of radioactivity, Henry Becquerel

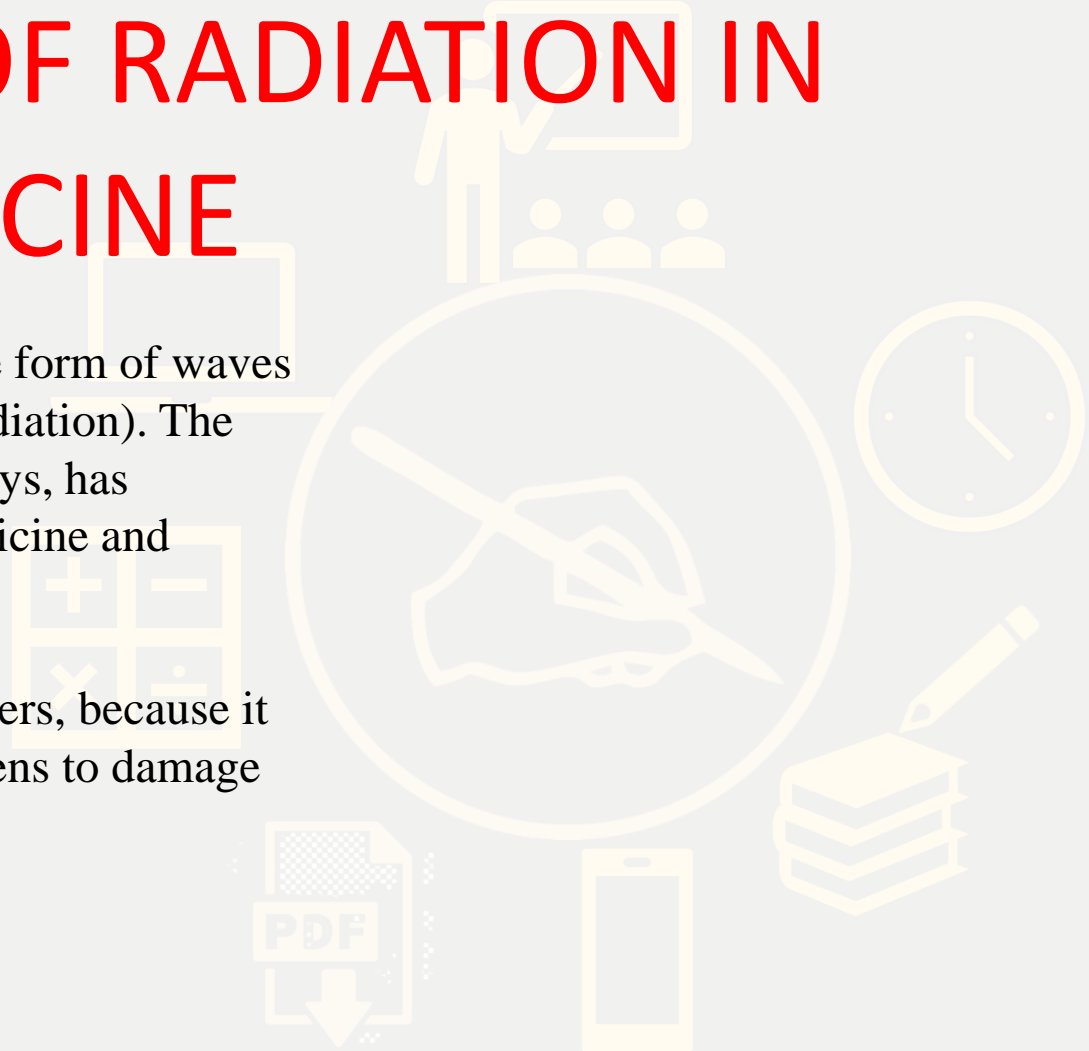




IMPORTANCE OF RADIATION IN VACCINE

Radiation is the emission or transmission of energy in the form of waves (ionizing radiation) or electron particles (non-ionizing radiation). The use of ionizing radiation, including X-rays and gamma rays, has increased substantially over the last 30 years in both medicine and industry

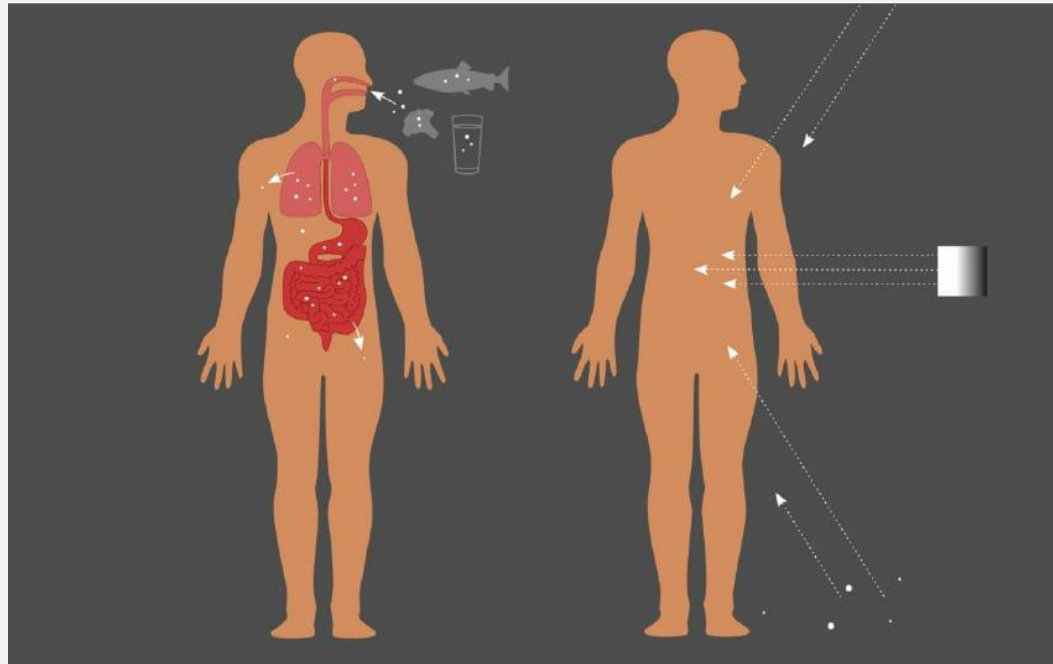
Radiation technology is of interest to vaccine manufacturers, because it can remove chemical contaminants and penetrate pathogens to damage the DNA.





DO WE HAVE RADIOACTIVE ELEMENTS INSIDE OUR BODY?

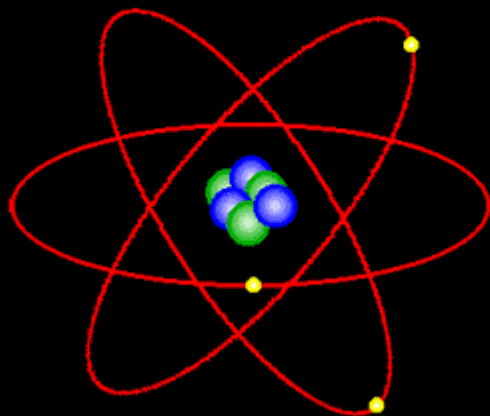
YES





What do we mean by nuclei?

STRUCTURE OF AN ATOM

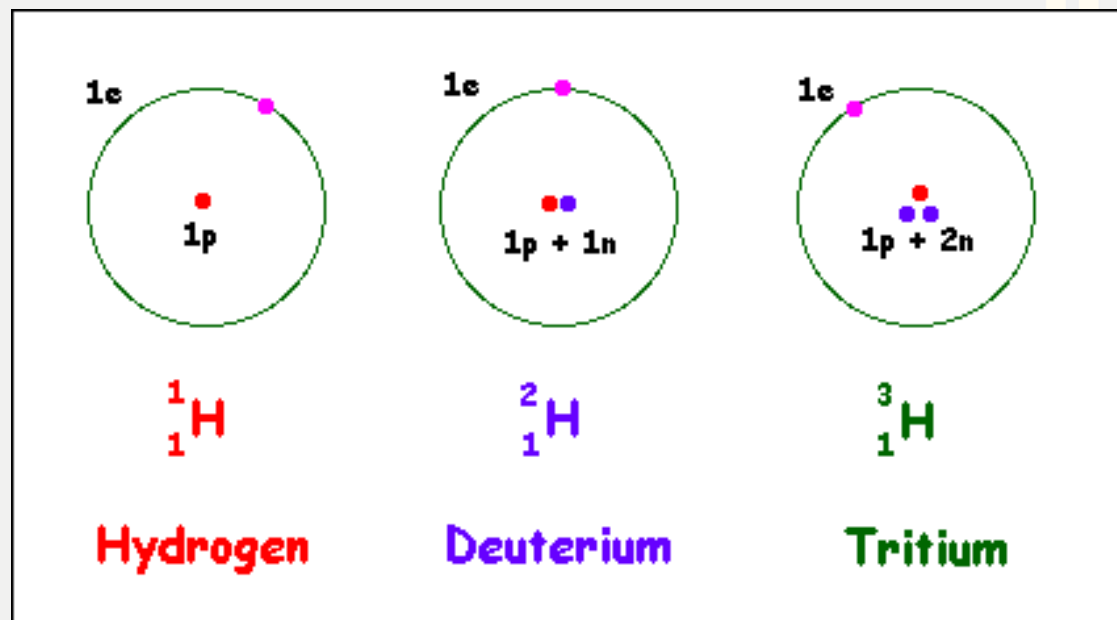


Atomic Number- The number of protons that are present in the nucleus of an atom. It is denoted by Z

Atomic mass- The total number of protons and neutrons is known as atomic mass. It is denoted as A .



Isotopes



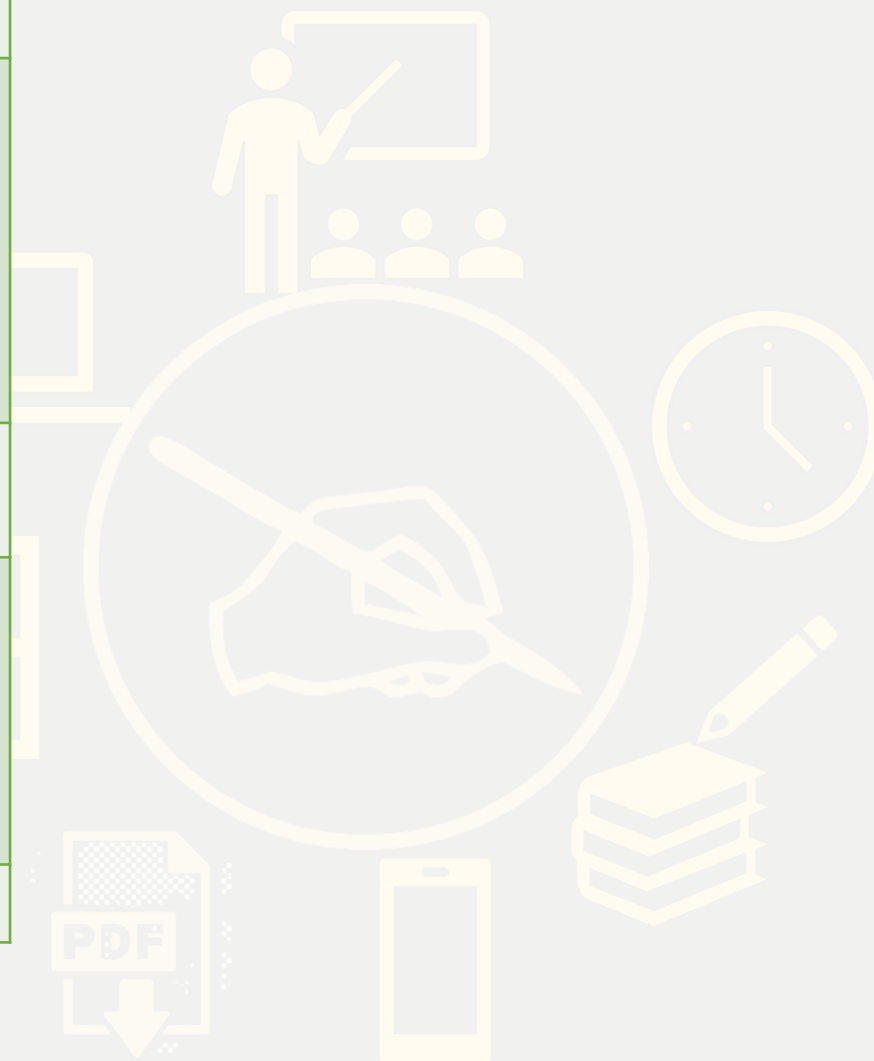


Isotopes	Their uses
Cobalt-60	Used to sterilize surgical instruments...and to improve the safety and reliability of industrial fuel oil burners. Used in cancer treatment, food irradiation, gauges, and radiography.
Iodine-123	Widely used to diagnose thyroid disorders and other metabolic disorders including brain function.
Iodine-125	Major diagnostic tool used in clinical tests and to diagnose thyroid disorders. Also used in biomedical research.
Iodine-129	Major diagnostic tool used in clinical tests and to diagnose thyroid disorders. Also used in biomedical research.



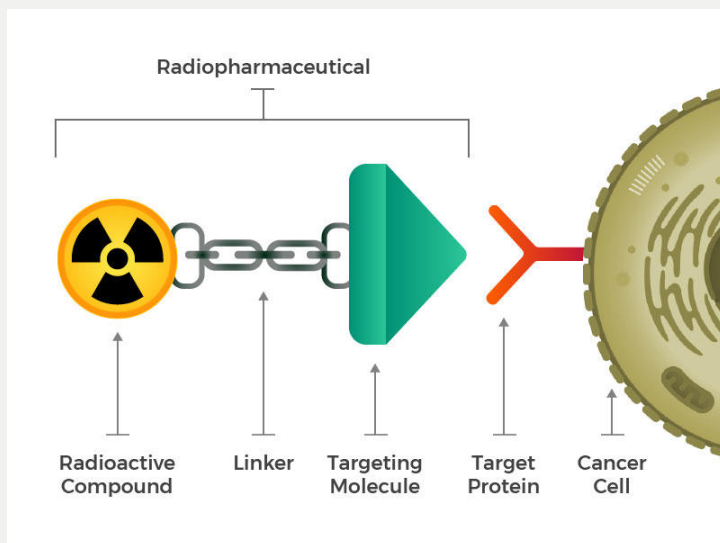


Isotopes	Their uses
Americum-241	Used in many smoke detectors for homes and businesses... to measure levels of toxic lead in dried paint samples...to ensure uniform thickness in rolling processes like steel and paper production...and to help determine where oil wells should be drilled.
Cadmium-109	Used to analyze metal alloys for checking stock, scrap sorting
Carbon-14	Major research tool. Helps in research to ensure that potential new drugs are metabolized without forming harmful by-products. Used in biological research, agriculture, pollution control, and archeology.
Cobalt-57	Used as a tracer to diagnose pernicious anemia





Isotopes	Their uses
Iodine-192	Used to treat thyroid disorders. (Graves's disease)
Nickel-63	Used to detect explosives, and in voltage regulators and current surge protectors in electronic devices, and in electron capture detectors for gas chromatographs
Plutonium-238	Has powered more than 20 NASA spacecraft since 1972
Sulphur-35	Used in genetics and molecular biology research



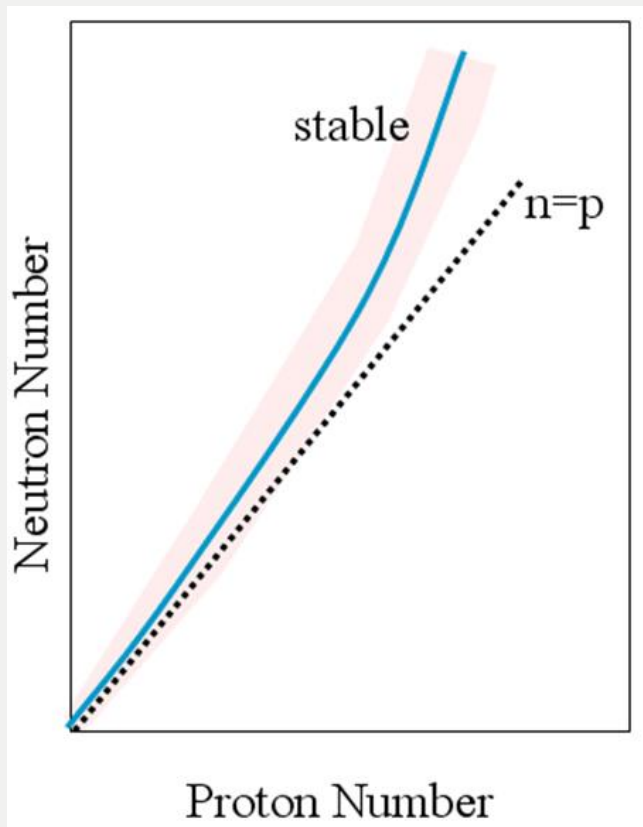


Isotopes	Their uses
Thallium-201	Used in nuclear medicine for nuclear cardiology and tumor detection.
Thorium-229	Helps fluorescent lights last longer.
Tritium	Major tool for biomedical research. Used for life science and drug metabolism studies to ensure the safety of potential new drugs...for self-luminous aircraft and commercial exit signs...for luminous dials, gauges and wrist watches...to produce luminous paint, and for geological prospecting and hydrology.
Uranium-234	Used in dental fixtures like crowns and dentures to provide a natural color and brightness.
Uranium-235	Fuel for nuclear power plants and naval nuclear propulsion systems...and used to produce fluorescent glassware, a variety of colored glazes and wall tiles.





Let's identify unstable nuclei



Stability Belt: Nucleus present in this belt are stable.

- If Atomic Number(z) is less than 20 or equal to 20. Then no. of Neutron = No of Proton & this will present on stability belt. Eg. ${}_8\text{O}^{16}$ [8Proton & 8 Neutron], ${}_6\text{C}^{12}$
- After atomic number 20..Neutron no. must be greater than no of proton to be stable. Eg. ${}_{26}\text{Fe}^{56}$
- After atomic number 80. All are Radioactive.



Alpha Decay

**Spontaneous Alpha Decay
of a ^{239}Pu Nucleus**

^{239}Pu

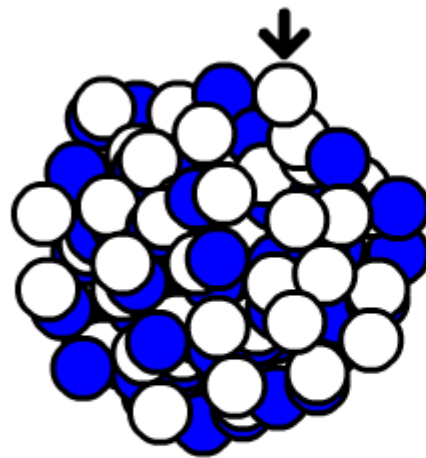




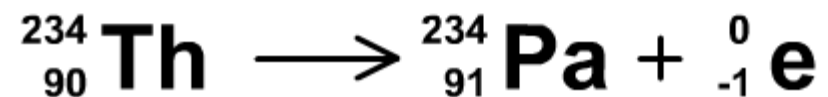
Beta Decay

Beta Decay of Th-234

Neutron becomes a proton



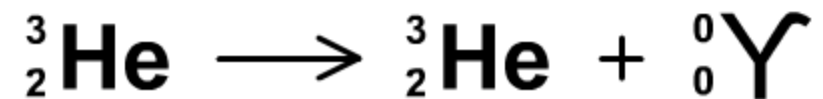
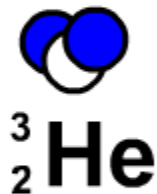
$^{234}_{90}\text{Th}$





Gamma decay

Gama Decay of He-3



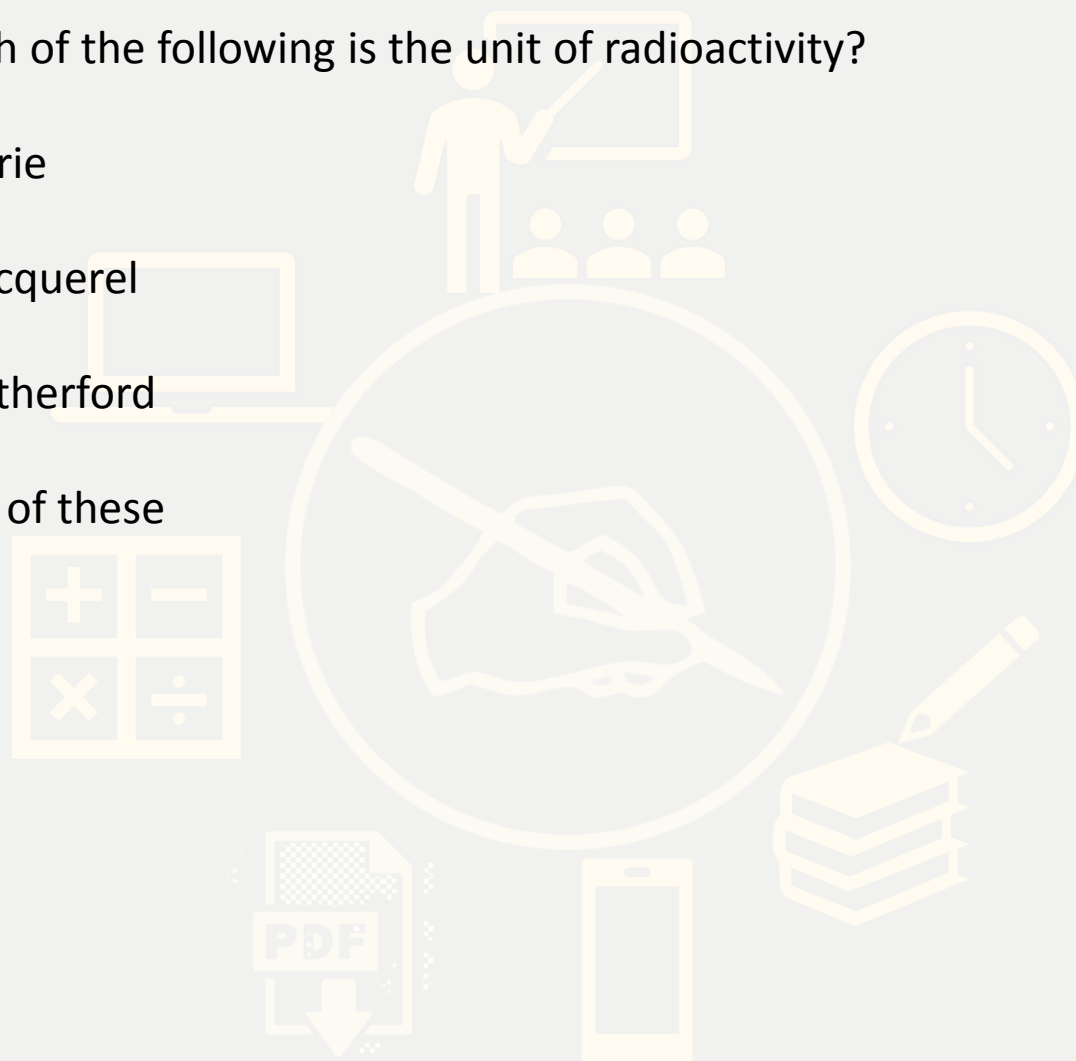


How many charges alpha-rays consist of?

- A. Two unit positive charges
- B. Unit negative charge
- C. Unit positive charge
- D. None of these

Which of the following is the unit of radioactivity?

- A. Curie
- B. Becquerel
- C. Rutherford
- D. All of these



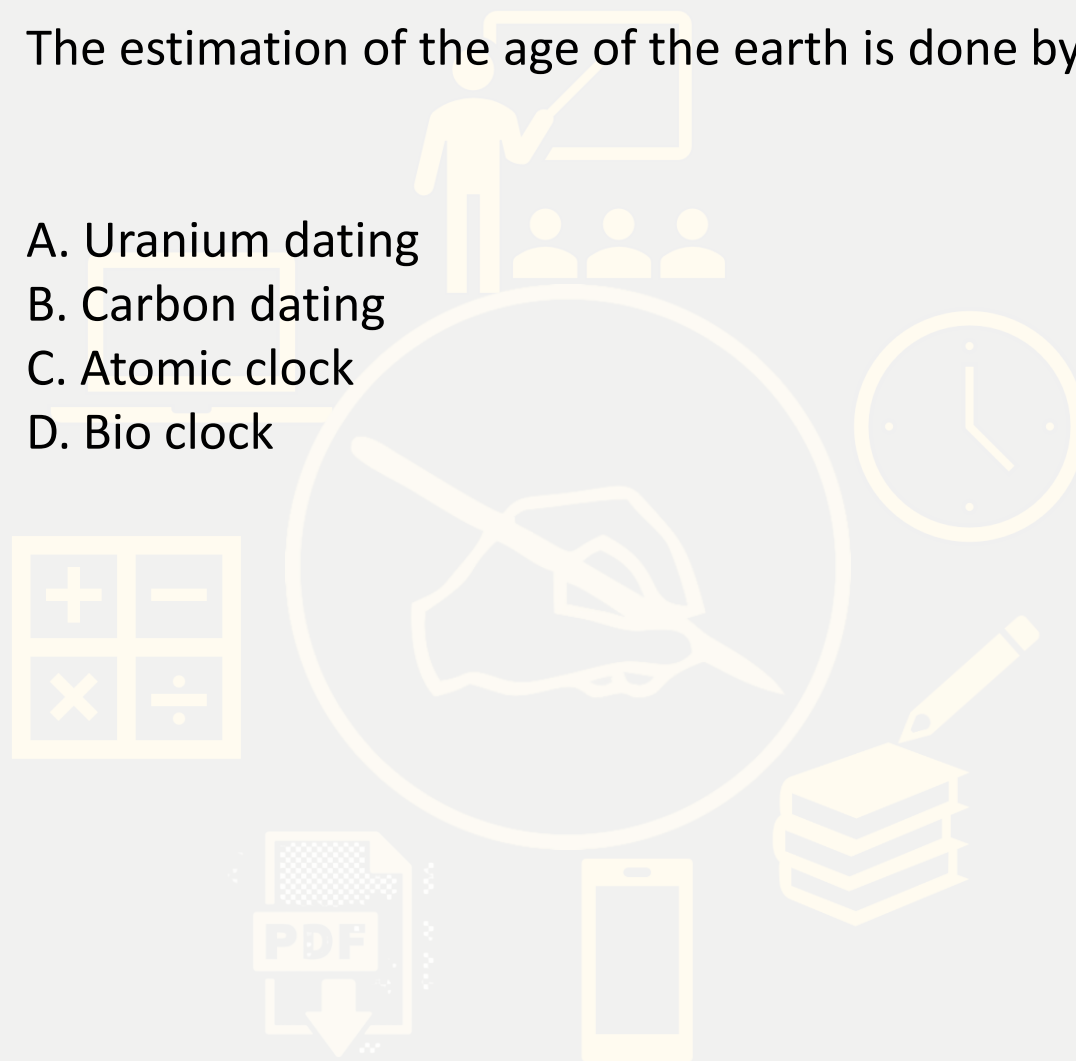


The substance (element) obtained after emission of a beta-particle from ${}_{11}\text{Na}^{22}$

- A. Mg
- B. Mn
- C. Ag
- D. Pb

The estimation of the age of the earth is done by:

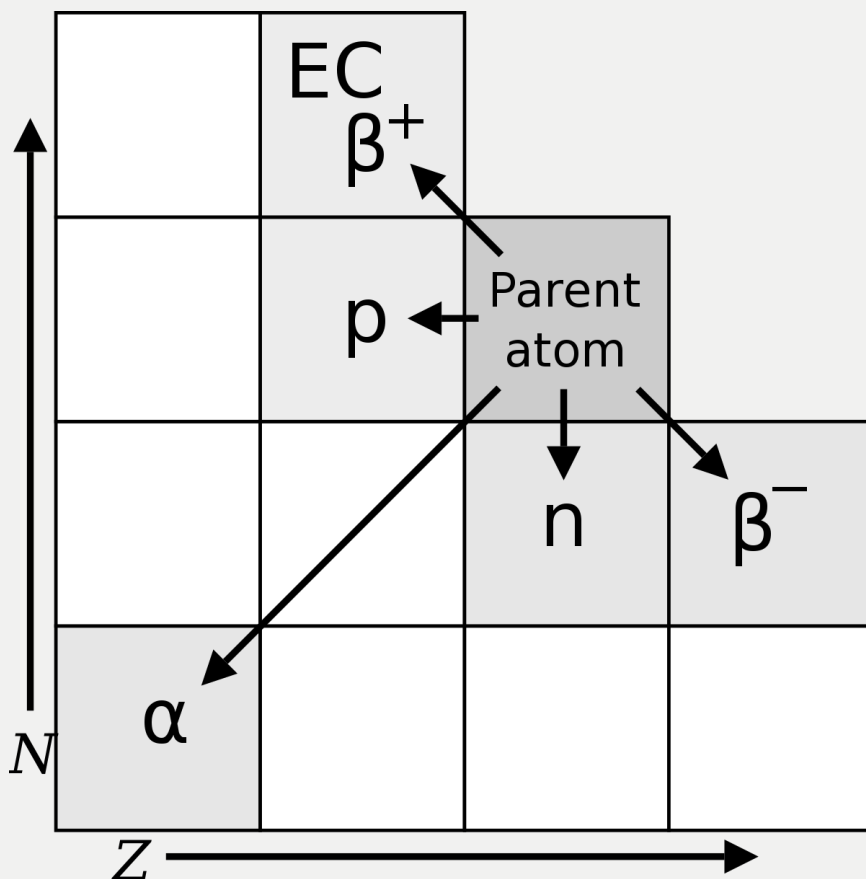
- A. Uranium dating
- B. Carbon dating
- C. Atomic clock
- D. Bio clock





The group displacement law is propounded by:

- A. Sody & Fujan
- B. Rutherford & Sody
- C. Rutherford & Fujan
- D. Rutherford & Madam Curie



The number of isotopes in the hydrogen:

- A. 2
- B. 3
- C. 4
- D. 5

