Nuclear physics Points to Remember

- This phenomenon of spontaneous emission of radiation from certain elements on its own is called 'natural radioactivity'.
- **Curie** is defined as the quantity of a radioactive substance, which undergoes 3.7 × 1010 disintegrations in one second. This is actually close to the activity of 1 g of radium-226.
- **Rutherford (Rd)** is defined as the quantity of a radioactive substance which produces 106 disintegrations in one second. 1 Rd = 106 disintegrations per second.
- The SI unit of radioactivity is **becquerel.** It is defined as the quantity of one disintegration per second.
- Helium nucleus ($_2He^4$) consisting of two protons and two neutrons is known as alpha particle .
- Beta particles are electrons ($_{-1}e^0$), which are the basic elementary particles present in all atoms.
- Gamma rays are electromagnetic waves consisting of photons.
- A nuclear reaction in which an unstable parent nucleus emits an alpha particle and forms a stable daughter nucleus is called as 'alpha decay'.
- A nuclear reaction in which an unstable parent nucleus emits a beta particle and forms a stable daughter nucleus is called as 'beta decay
- The process of breaking (splitting) up of a heavier nucleus into two smaller nuclei with the release of a large amount of energy is called **'nuclear fission'.**
- The energy released in a nuclear fission process is about 200 MeV.
- There are some radioactive elements which can be converted into a fissionable material. They are called as '**fertile materials**'. e.g. Uranium-238, Thorium-232, Plutonium-240.
- Controlled chain reaction is used in a nuclear reactor to produce energy in a sustained and controlled manner.
- The process in which two lighter nuclei combine to form a heavier nucleus is termed as **'nuclear fusion'.**
- Nuclear fusion or thermonuclear reaction is the source of light and heat energy in the Sun and other stars.
- The safe limit of receiving the radiation is about 100 mR per week.