Module: ***Scientific English***
Level: ***3rd Year***

Introduction to Biotechnology

Bio-Technology, as the word suggests, is the use of living things especially cells and bacteria for production of various products for benefiting human beings. It is a combination of various technologies, applied together to living cells, including not only biology, but also subjects like mathematics, physics, chemistry and engineering. Its application ranges from agriculture (Animal Husbandry, Cropping system, Soil science and Soil Conservation, Plant Physiology, Seed Technology and Crop Management etc.) to industry (food, pharmaceutical, chemical, byproducts, textiles etc.), medicine, nutrition, environmental conservation, Cell Biology, making it one of the fastest growing fields. In other words, biotechnology is the use of technology to modify or upgrade the part or whole of biological system for getting beneficial products.

I. History

People were using biotechnology techniques thousands years before but they did not named their working field as biotechnology. The name biotechnology was given by Hungarian engineer Karoly Ereky in 1919 to describe a technology based on converting raw materials into a more useful product.

After the end of the second world war some, very crucial discoveries were reported, which paved the path for modern biotechnology and to its current status. The latter provides breakthrough products and technologies to combat rare diseases, reduce our environmental footprint, fight hunger, use less and cleaner energy, and have safer and more efficient industrial manufacturing processes. Currently, there are:

- More than 250 biotechnology health care products and vaccines available to patients, many for previously untreatable diseases.
- More than 13.3 million farmers around the world use agricultural biotechnology to increase yields, prevent damage from pests and reduce farming's impact on the environment.
- More than 50 biorefineries are being built across North America to test and refine technologies to produce biofuels and chemicals from renewable biomass, which can help reduce greenhouse gas emissions.

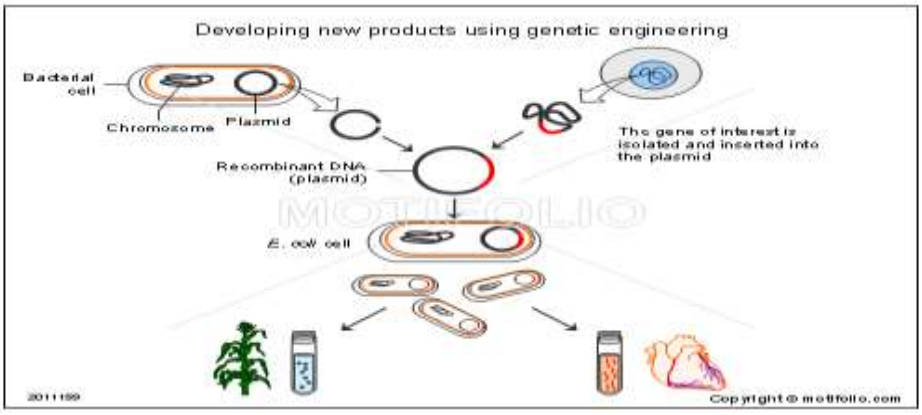
II. Basic Techniques in Biotechnology:

There are various techniques of biotechnology such as:

1. Genetic engineering:

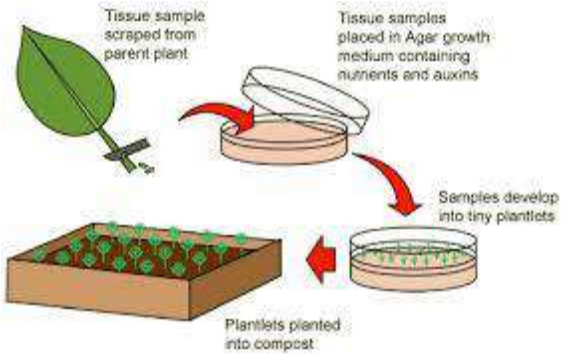
Genetic engineering, also called genetic modification, is the direct manipulation of an organism's genomeusing biotechnology.

Genes are the chemical blueprints that determine an organism's traits. Moving genes from one organism to another transfers those traits. Through genetic engineering, organisms can be given targeted combinations of new genes, and therefore new combinations of traits that do not occur in nature and, indeed, cannot be developed by natural means. Such an approach is different from classical plant and animal breeding, which operates through selection across many generations for traits of interest.



2. Tissue culture :

Tissue culture, a method of biological research in which fragments of tissue from an animal or plant are transferred to an artificial environment in which they can continue to survive and function. The cultured tissue may consist of a single cell, a population of cells, or a whole or part of an organ. Cells in culture may multiply; change size, form, function or interact with other cells.



3. Cloning:

Cloning describes the processes used to create an exact genetic replica of another cell, tissue or organism. The copied material, which has the same genetic makeup as the original, is referred to as a clone. The most famous clone was a Scottish sheep named Dolly.

There are three different types of cloning:

- Gene cloning, which creates copies of genes or segments of DNA
- Reproductive cloning, which creates copies of whole animals

Therapeutic cloning, which creates embryonic stem cells. Researchers hope to use these cells to grow healthy tissue to replace injured or diseased tissues in the human body.