

Contribution of Engineering in biological domain ①

1) Contribution of Microscope :-

Engineering has played an important role in the biological domain, especially through the development of microscopes. By using microscope scientists were able to

- i) Discover the existence of microorganisms.
- ii) Study the structure of cells.
- iii) See the small parts of plants, animals and fungi.
- iv) Scanning electron microscope are able to resolve viruses, which are far smaller than any cell.
- v) The main application of microscope is in scientific research.

2) Contribution of Imaging techniques

Imaging techniques are the types of test that makes detailed pictures of areas inside the body.

Imaging techniques procedures use different forms of energy, such as X-ray (high-energy radiation), ultrasound (high energy sound wave), radio wave and radioactive

② Substance.

Different imaging techniques helps in biological domain are as follows:-

i) X-ray machine :- X-ray machine is imaging. Most common type of medical technique uses to detect fracture of bones in our body.

ii) MRI (Magnetic Resonance Imaging) :-

This technique uses powerful magnets and radio wave to create detailed images of the body's internal structure.

Ex:- Image of brain & organs (spine)

iii) CT scans (Computed Tomography) :-

These create cross-sectional images of the body by combining multiple x-ray images taken from different angles.

Ex:- CT scans at tumors, bone fractures, chest infection and internal bleeding etc.

iv) Ultrasound :- Ultrasound is commonly used during pregnancy to monitor fetal development.

It can visualize (see) internal organs such as the liver, kidneys, gallbladder etc. (3)

3) Contribution of Bio-medical instruments:

Biomedical instruments are devices designed for use in the field of healthcare and medicine. They help doctors & nurses in different ways:

i) Diagnosis: Biomedical instruments play a very important role in diagnosing various medical conditions of about a patient's health status.

Devices such as x-ray machines, MRI scanners, ultrasound machines, and laboratory analyzers etc are used for diagnosis.

ii) Monitoring: - They also help in monitoring vital signs and physiological parameter of patient.

Ex:-

~~was~~ Machines

Monitoring

a) ECG (Electrocardiogram) → patient ~~last~~ heart rate monitor

b) Pulse oximeter → oxygen saturation

c) Blood pressure monitors → blood pressure

④

d) Glucose meter → blood glucose ~~meter~~ level.

iii) Treatment : Biomedical instruments help in giving treatments. They can help give medicine, help people breathe and even help in surgeries.

Ex:- Infusion pumps (capable of delivering) ventilators ~~and~~, surgical instruments aid ~~etc.~~ ^{fluid} and defibrillators (apply electric current to the ~~hot~~ heart to restore a normal heartbeat)

(iv) Research and development : - Scientists use biomedical instruments to learn about diseases and find new ways to treat them.

They use tools like microscope and genetic analyzers to study how our bodies work.

v) Rehabilitation and Assistive Devices : - Bio-medical ^{उपकरण} _(अपकरण) instruments also include rehabilitation and assistive devices.

They help individuals with disabilities.
Ex:- People who have trouble moving, things like artificial limbs help them in walking