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1 Sensors and Actuators for Biomedical Applications  
Sensors are electronic devices that measure physical attributes such as temperature, pressure, distance, torque etc. from equipment appliances, machine and any other system. They are responsible for taking data that comes into a machine. A sensor changes a physical parameter into an electrical output and is usually situated at the input port to take the input. It is broadly classified into Analog & Digital sensors. Examples of sensors include: Temperature sensors, Radiation sensors, Proximity sensors, pressure sensors, position sensors, particle sensors etc.

Actuators are devices that use a form of power to convert a control signal into mechanical motion. It is a component of a machine that is responsible for moving and controlling a mechanism or system i.e. It provides linear motion/converts an electrical signal to a physical output. An actuator is usually placed at the output port. They perform actions. Examples of actuators are: Electric linear actuator, Electric Rotary actuator, Hydraulic linear actuator, pneumatic linear actuator, piezoelectric actuator etc.

### 3 Medical measuring instruments.

#### a Sphygmomanometer

This is a medical instrument used for measuring blood pressures, typically consisting of an inflatable rubber cuff which is applied to the arm and connected to a column of mercury next to a graduated scale, enabling the determination of systolic and diastolic blood pressure by increasing and gradually releasing the pressure in the cuff. It is of three types 1. Mercury aneroid and digital.

#### b Stethoscope

It is an acoustic medical device for auscultation, or listening to internal sounds of an animal or human body. It typically has a small disc-shaped resonator that is placed against the skin, and one or two tubes connected to two earpieces. A stethoscope can be used to listen to the sounds made by the heart, lungs or intestines as well as blood flows in arteries and veins. In combination with a manual sphygmomanometer, it is commonly used when measuring blood pressure.