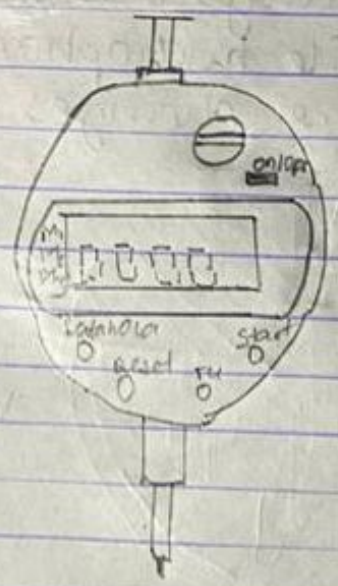
c) Digital indicator

These are flexible devices which can be used in many different fields such as industry and research, as well as a wide variety of measurement works. They also allow the user to view diverse parameters such as temperature, humidity, vibration, normalized signal etc.



Digital indicator

d Force sensor

This weigh freight on manufacturing and transportation equipment. They also monitor loads on machines subject to stringent safety standards such as mine lifts, construction cranes, industrial tanks, grain silos, and locomotives. To ensure equipment is not overloaded.

Force sensor

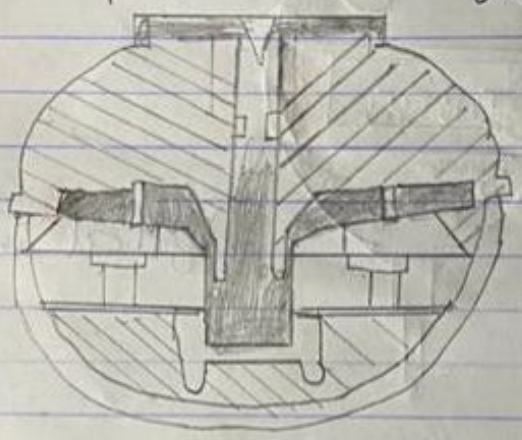
Unlike many other medical imaging techniques, endoscopes are inserted directly into the organ. A patient may be fully conscious or anaesthetised during the process or procedure.

Example include
Cystoscope (bladder),
Nephroscope (kidney)
Bronchoscope
Arthroscope (joints)
Colonoscope (colon).
and Laparoscope (abdomen or pelvis)

Number ②

2a **Vector sensors:**

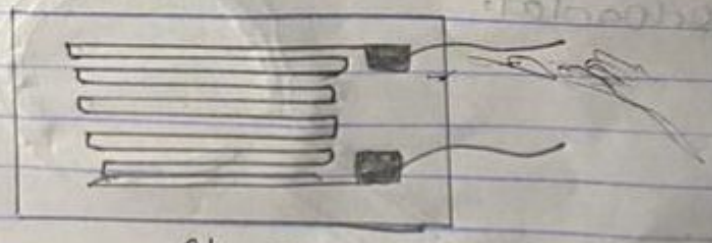
This is an underwater listening device used to detect sounds in water and convert acoustic energy into electrical energy. Vector sensors differ from hydrophones, which are also underwater listening devices, in that vector sensors measure both the particle motion and pressure changes associated with a sound wave, while hydrophones measure only the pressure changes



Vector sensors.

b **Strain guage**

A strain guage is a device used to measure strain on an object. The most common type strain guage consists of an insulating flexible backing which supports a metallic foil pattern



Strain guage

Number (3)

3.a Dialysis is the process of removing excess water, solutes from the blood whose kidneys can no longer perfom there functions properly.

This is reffered to as renal replacement therapy

Dialysis may need to be inserted when there is sudden loss of kidney function, which is known as acute kidney.

Principle

Dialysis work on the principles of the diffusion of solutes and ultrafiltration of fluid across a

Semi-pemeable membrane- Diffusion is a property of substances in water; substances in water tend to move from an area of high concentration to an area of low consentration.

* passive diffusion occurs when a high to low concentration gradient is present between the patient's blood and dialysis solution (dialysate) used.

* Ultrafiltration ensures excess fluid is cleared from the body through the use of a positive (blood) or negative (dialysate) pressure gradient, moving fluid from a high to low pressure region.

The main types of RRT established renal failure are

- Haemodialysis (HD)
- Haemodiafiltration (HDF)
- Peritoneal dialysis (PD)
- Kidney transplantation.

3b. An endoscope is an illuminated optical, typically slender and tubular instrument (a type of borescope) used to look deep into the body and used in procedures called an endoscopy. Endoscopes use tubes which are only a few millimeters thick to transfer illumination in one direction and high-resolution images in real time in the other direction, resulting in minimally invasive surgeries.

~~Examples include~~ Principle.

The endoscopy procedure uses an endoscope to examine the interior of a hollow organ or

Number (1)

1. A sensor is a device, module, machine or subsystem whose purpose is to detect circuit in its environment and send the information to other electronics. A sensor is always used with other electronics.

e.g. a. Temperature sensor
b. Proximity sensor
c. Accelerator
d. IR sensor
e. Pressure sensor
f. Light sensor

ii. An ~~activator~~ actuator is a component of a machine that is responsible for moving and controlling the system ~~for example by opening~~ In simple form, it is a "mover". An ~~activator~~ actuator requires a control signal and a source of energy. Examples are:

a. Comb drive
b. Digital micro device.
c. Electronic motor
d. Electroactive polymer
e. Hydrulic cylinder
f. Piezoelective activator