

Unit - V

Biometrics

Bio sensors:-

\* A Biosensor is an analytical device, used for the detection of an analyte, that combines a biological component with a physiochemical detector.

\* Biologically derived material or biomimetic component that interacts with the analyte.

Bio-transducer

\* A Bio transducer is the recognition transducer component of a bio sensor sm.

\* consists of two intimately coupled parts,

\* bio-recognition layer

\* Physicochemical transducer

\* biochemical signal to a electronic

or optical signal.

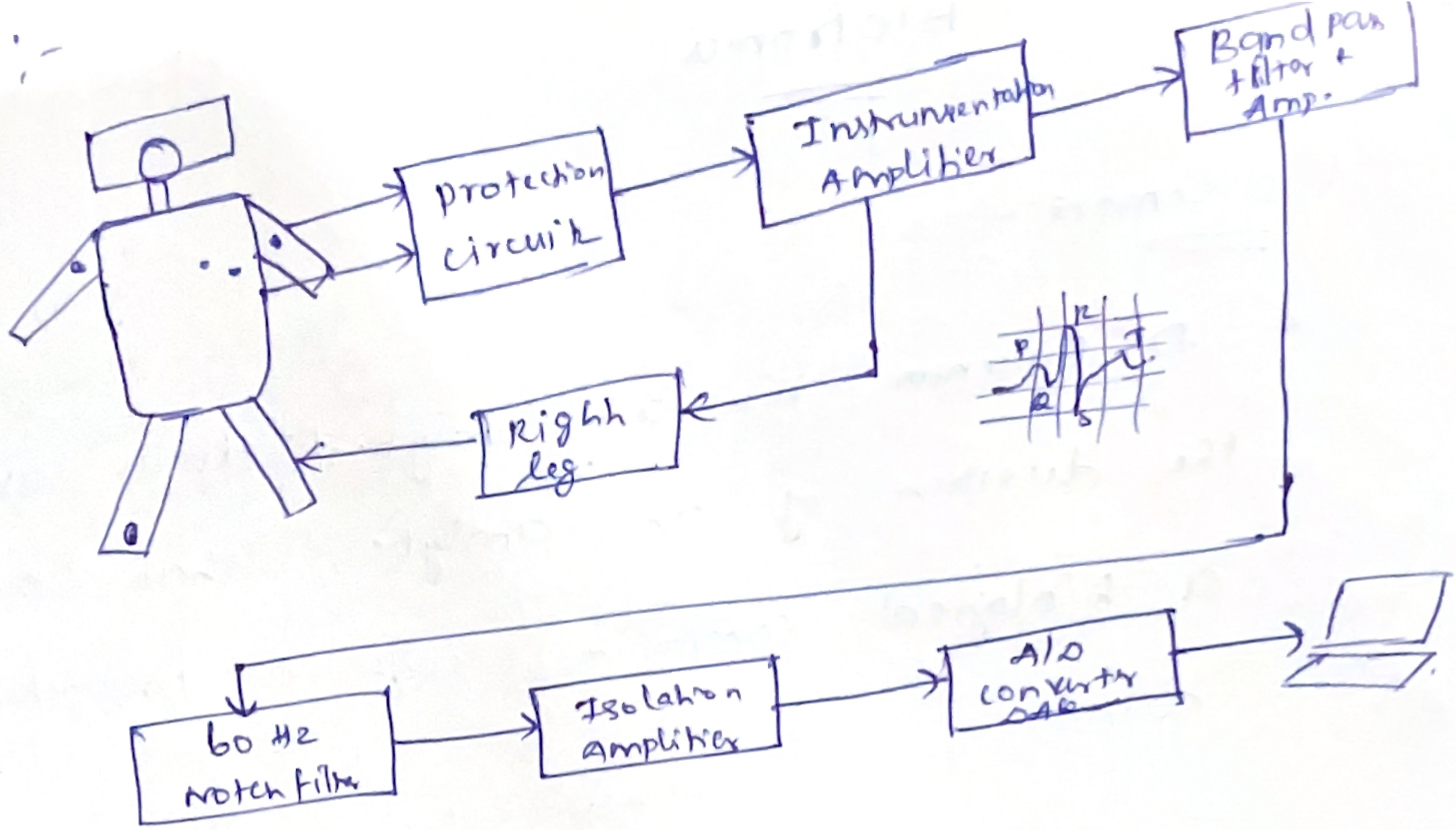
\* It consists of

\* enzyme

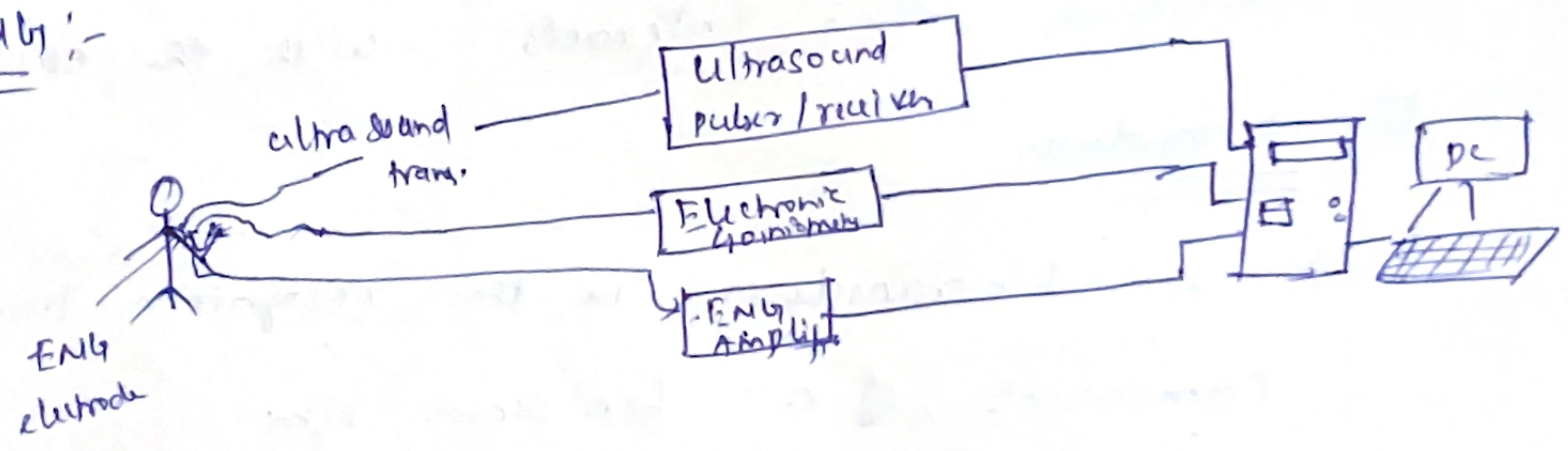
\* Antibody

\* sub cellular fragments.

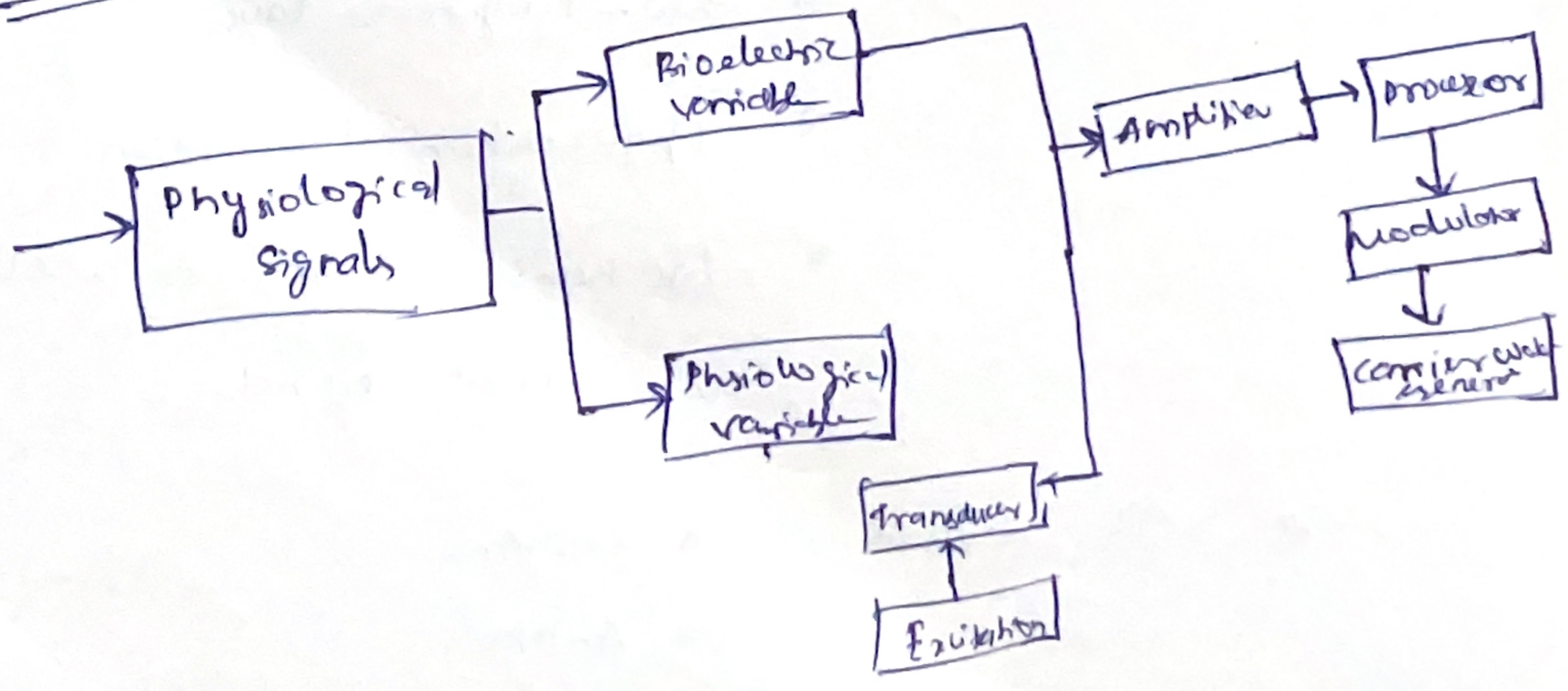
ECG :-



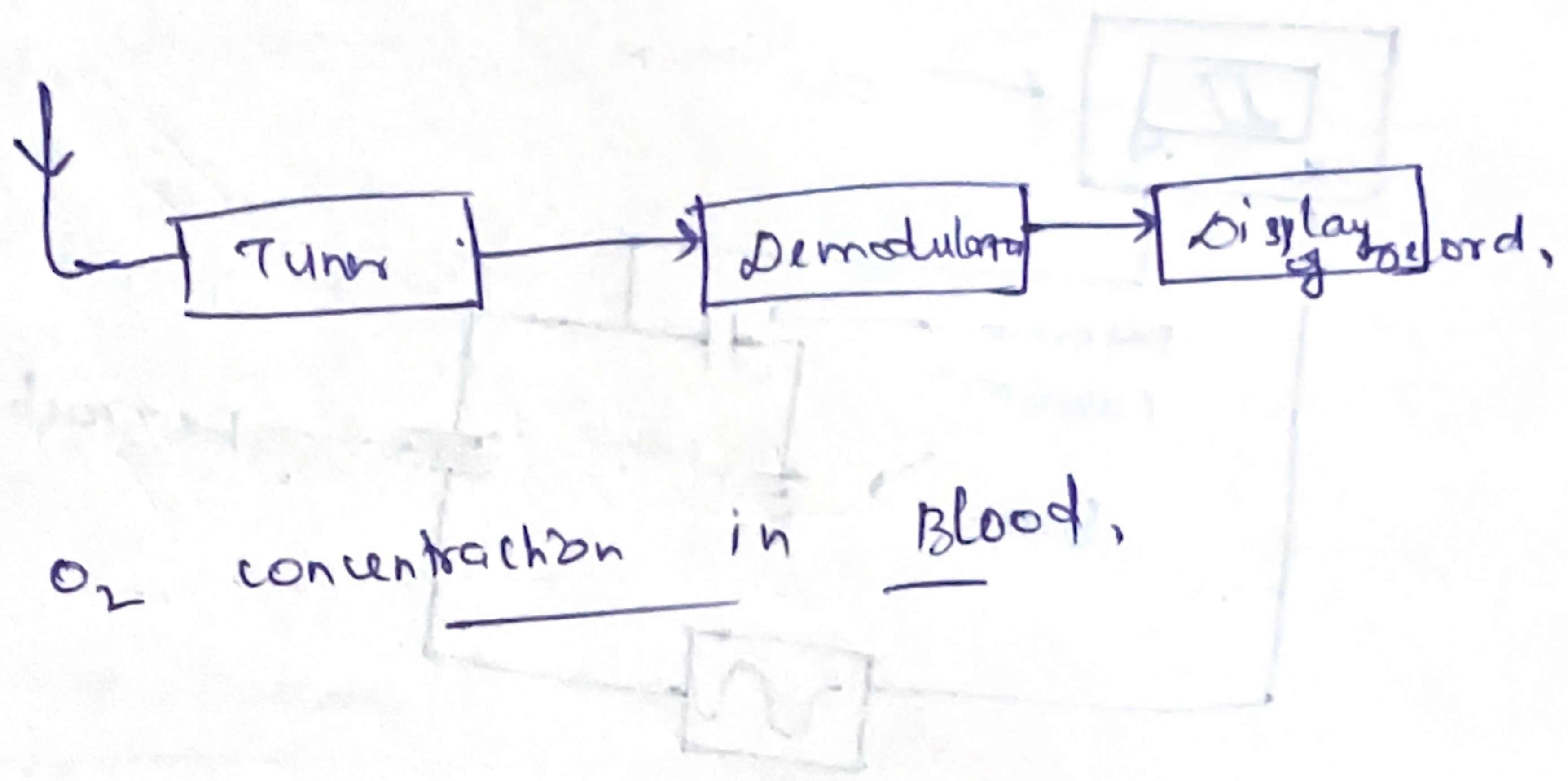
EMG :-



Biotelemetry.

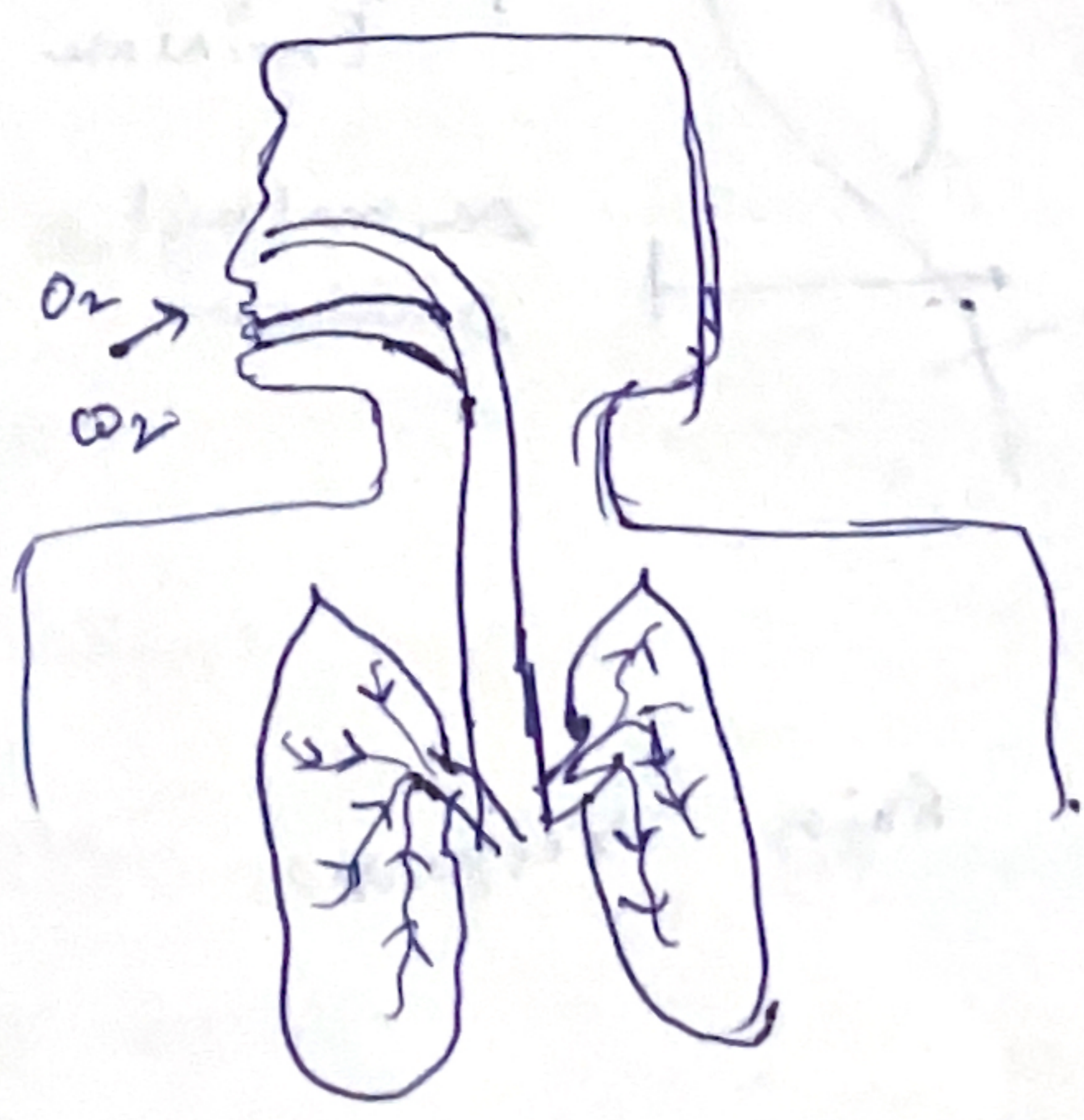


# Bio telemetry receiver

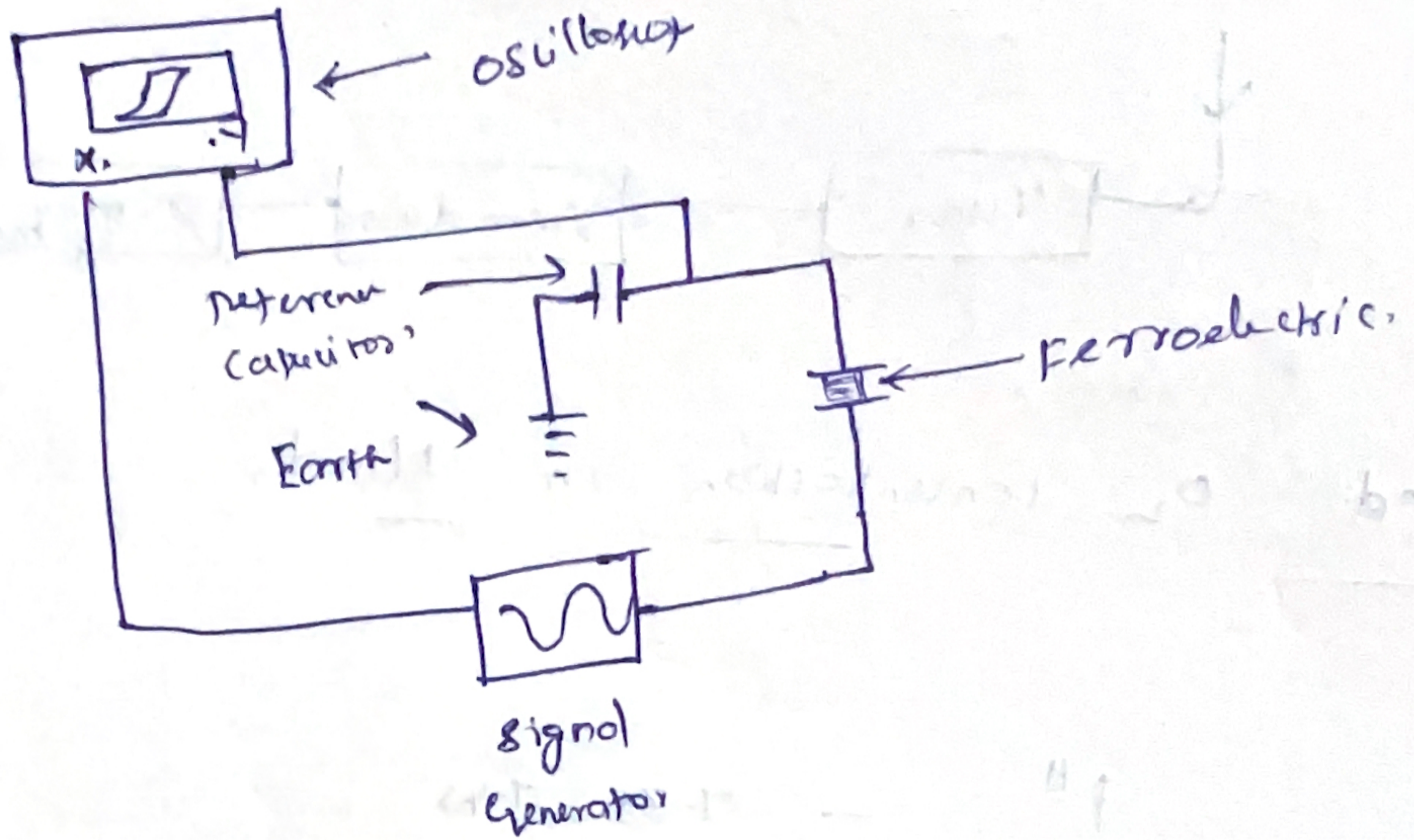


CO<sub>2</sub> and O<sub>2</sub> concentration in blood,

- pH — 7.35 - 7.45
- CO<sub>2</sub> — 35 - 45
- pO<sub>2</sub> — 80 - 100
- ACO<sub>2</sub> — 22 - 26
- O<sub>2</sub> sat. — 95 - 100%

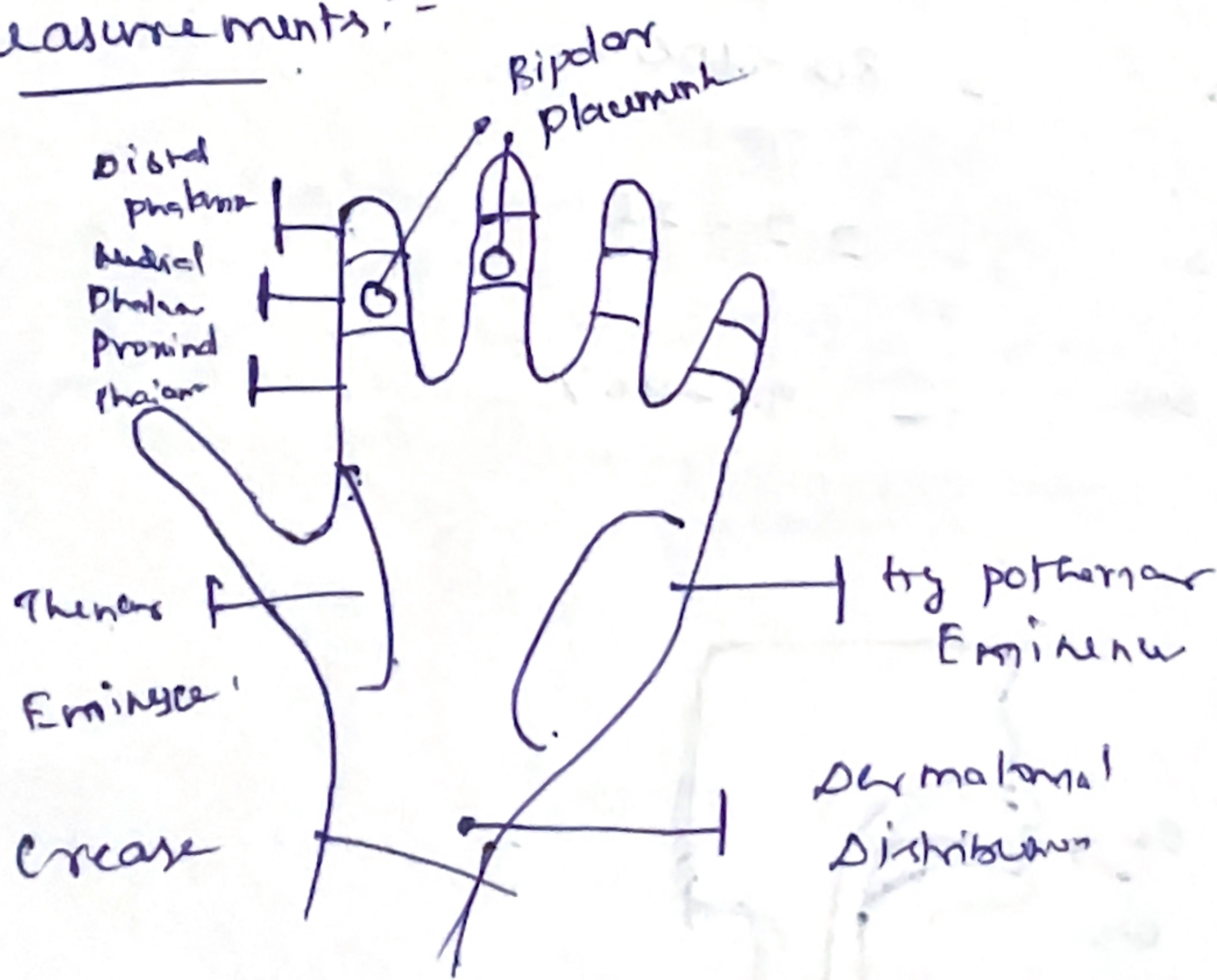


# ESR Measurements



→ Erythrocyte sedimentation rate.

# GSR Measurements:-



\* Galvanic skin response

\* Physicochemical response to emotional arousal

\* Measures electrical resistance of the skin

# Heart - Lung Machine.

## Function

- \* Pump function of heart.
- \* Gas exchange function of the lungs

## It must ensure

- \* Sufficient perfusion volume that corresponds to the normal cardiac output of the patient.
- \* Adequate perfusion pressure (50-90 mmHg)
- \* Sufficient oxygenation, elimination of  $CO_2$
- \* Control of the blood temperature.

## Structure:-

- \* Blood pumps
- \* Oxygenators
- \* Tubing S/m.
- \* Blood filters
- \* Cardiotomy Reservoir
- \* Cannulae and intracardiac suction.

## Blood pumps

- 1.1 Roller pumps
- 2.1 Centrifugal pumps.

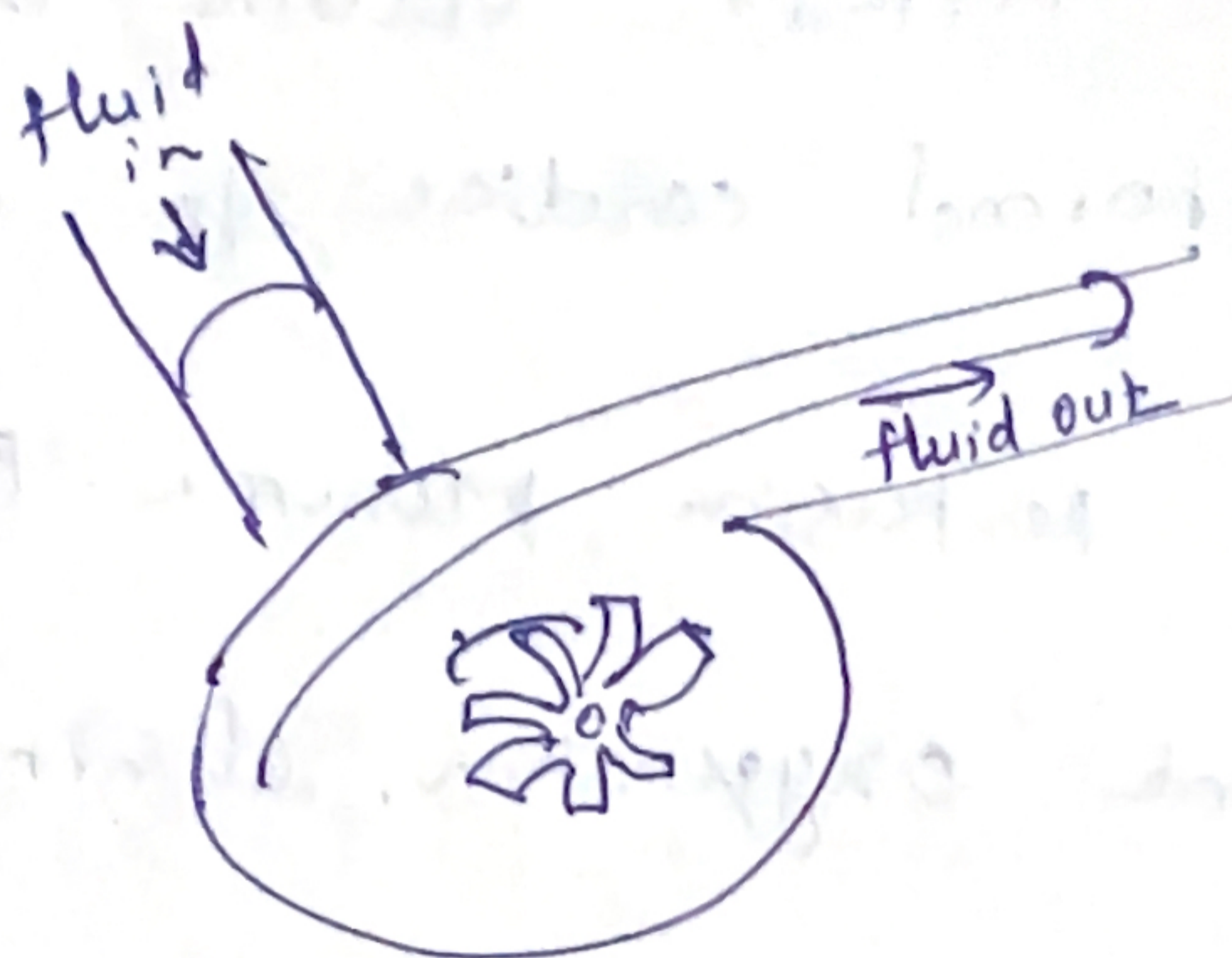
1.) Good delivery of liquids, with precise display of the actual flow rate and delivered volume.

2.) External control mechanism.

3.) Sufficient pressure (or) vacuum generation.

4.) Minimal blood damage.

### Blood pumps and their function



Centrifugal pump.

### The oxygenator

\* A cyl. glass vessel of 15 cm internal diameter, 38 cm long.

\* 80-100 stainless steel discs of 0.6 mm thickness and 14 cm diameter. are mounted axially with 3 mm spaces between discs.

Components:-

