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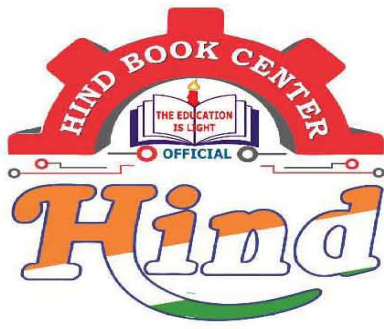
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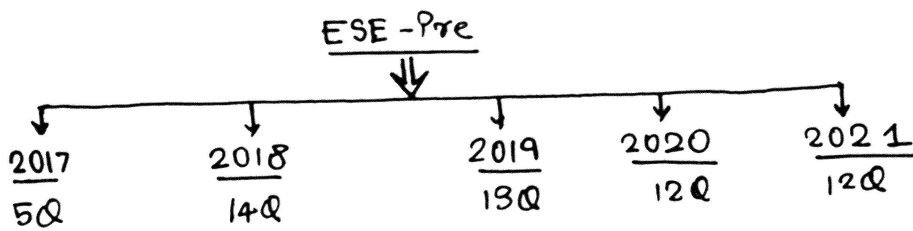
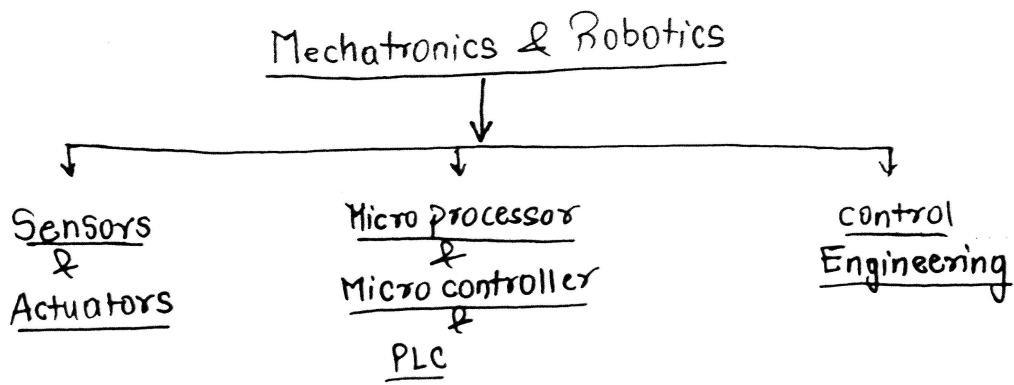
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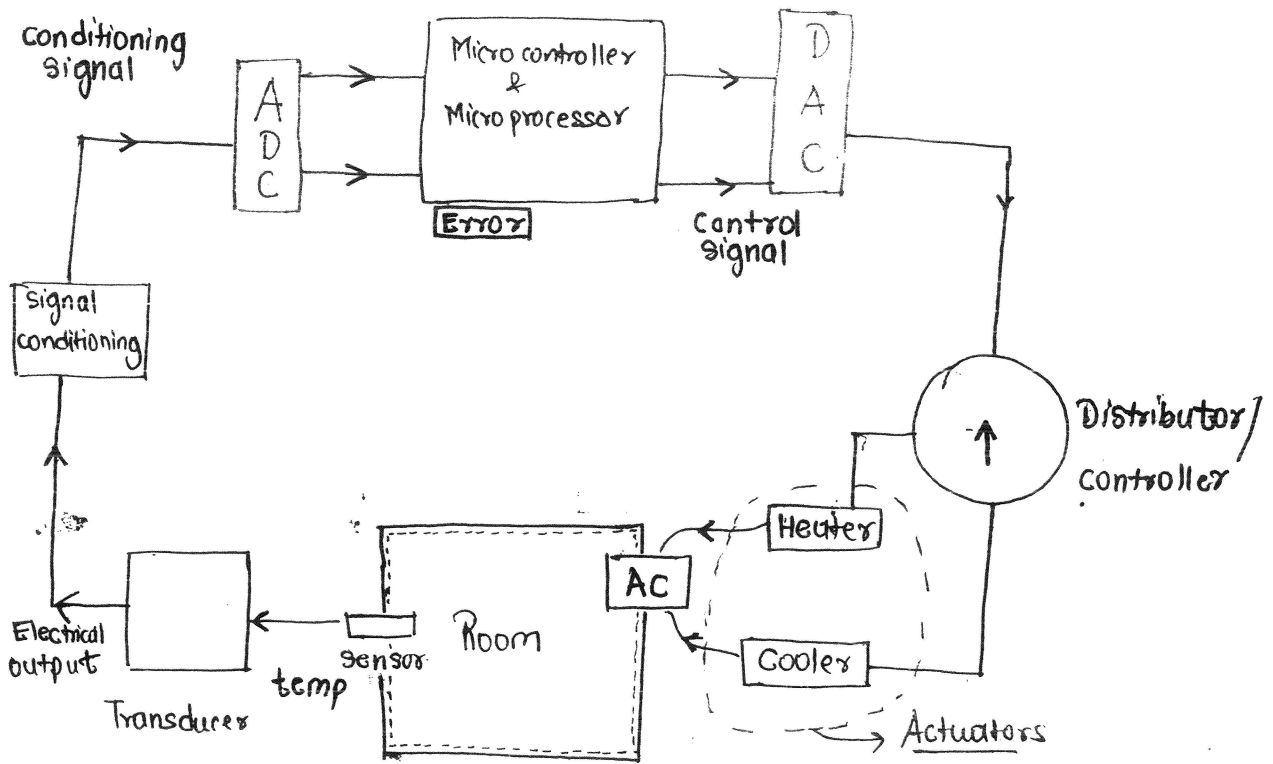
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State AE → 6 to 9Q

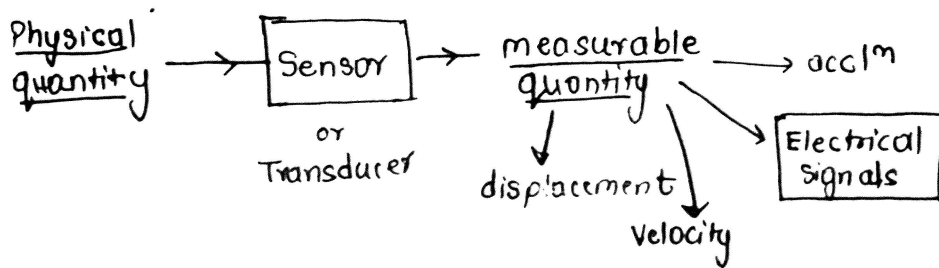
↳ (ESE PYQ / sample paper of ESE)

Conventional AC :



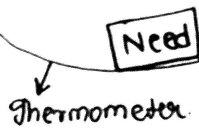
# Sensors :

Sensor is a device which is used to convert or measure or convert physical quantities into other measurable quantities

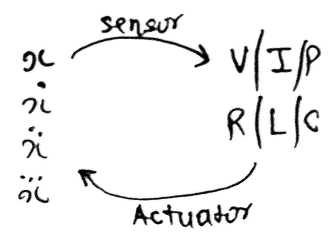


our main aim is to convert physical quantities into electrical signals only

Physical quantities	Derived quantities	Passive quantities	Active quantities	Digital quantities
T	$\alpha$	R Resistance	V	0
P	$\dot{\alpha}$	C capacitance	I	1
Vol	$\ddot{\alpha}$	L inductance	P	↓
Sound	$\ddot{\alpha}$	eg Strain gauge	Analog signals	Digital signal
Vibration	$\ddot{\alpha}$		eg Potentiometer	eg optical encoder
etc			2. Hall Effect sensor	



Our main aim is to convert physical quantities into V/I/P



R/L/C are steady component में आगे flow नहीं करते. Thus to measure them we convert into V/I/P which has ability to flow and can be measurable also

## Active Sensors

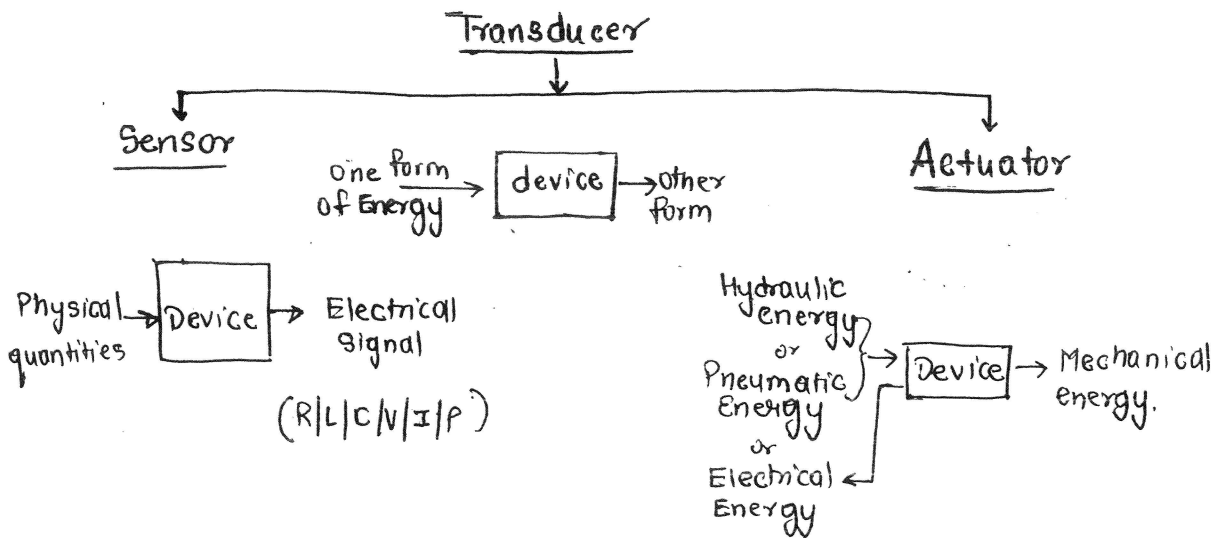
These sensor produces output which can be given directly to the computers

## Passive Sensors

These sensors are generally static as their output can't be transferred or used directly

Whenever we try to convert

## Transducer



A transducer is a device which converts one form of energy into another form. A Transducer can be divided into two parts

1. Sensor
2. Actuator

## Actuator

It is a device which converts one form of energy into Mechanical Energy

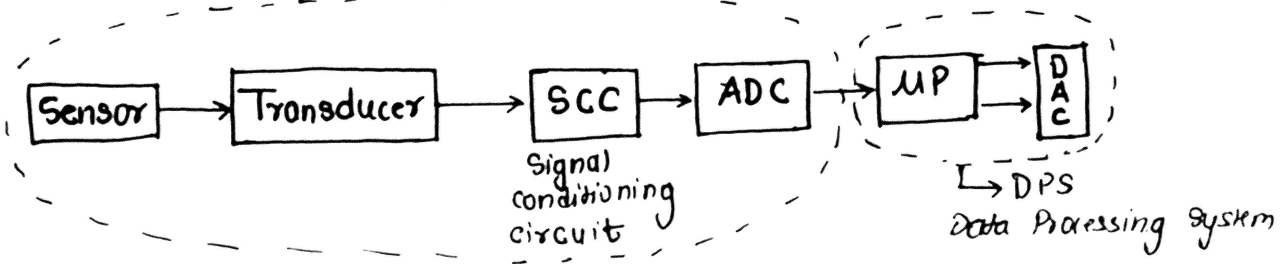
Hydraulic  $\rightarrow$  Mechanical

Pneumatic  $\leftrightarrow$  Mechanical  
 Pneumatic Actuator

Electrical  $\leftrightarrow$  Mechanical

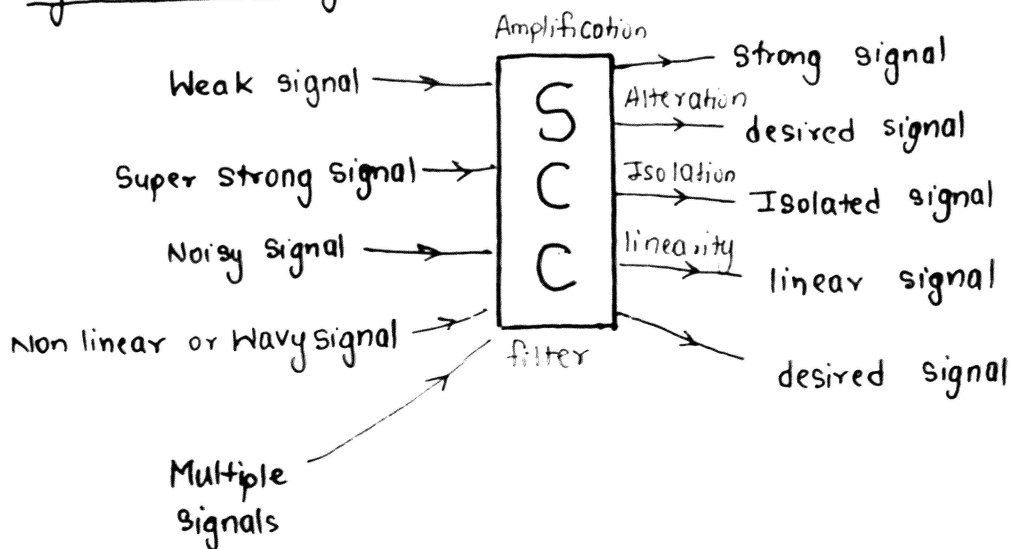
## DAS Data Acquisition System

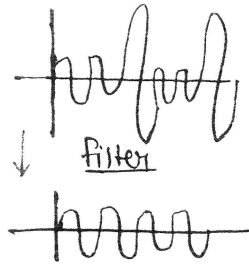
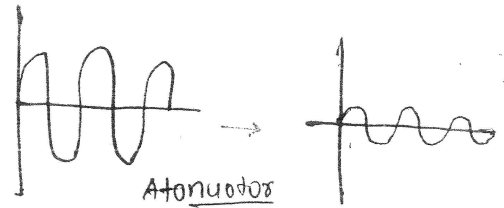
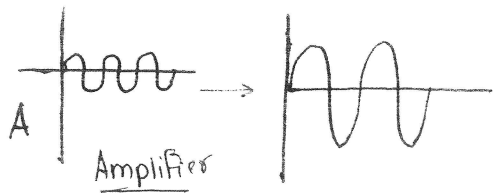
DAS/DAQ



It is a procedure by which data of physical quantities is provided to microprocessor/computer for further processing

## Signal conditioning circuit





A signal conditioning circuitry is used to manipulate the signal into desired form by using different different devices

NOTE If sensors generates o/p in form of R/L/C then we will use an electronic devices which converts R/L/C into V/I/P  
V/I/P are the desirable o/p

Amplifier: It is a device which is used to increase the amplitude of a signal (or) use to increase a signal strength

Attenuator: It is a device which is used to decrease the amplitude of a signal (or) used to reduce the strength of signal

Filter: It is a device which is used to select a particular signal with desired frequency from multiple signals

Low pass filter

High pass filter.

It is used to filter out the desired frequency from a signal

Statement - I: To use a sensor, we generally need to add a signal conditioning circuitry, such as circuits which amplify and convert analog signal to digital, to get the sensor signal in the right form, taking account of any non linearities and to calibrate it

Statement II: A smart sensor is a sensor integrated with the required buffering and conditioning circuitry in a single element and provides function beyond that of a sensor

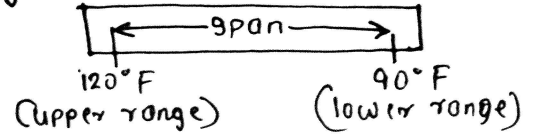
Ans : b



Q 1.35  
P-626

Q 1.27

eg Thermometer



Sensor Specification

Range: The range of a sensor indicates the limit between which the input can vary

Span: The span is the difference between the maximum and minimum value of input

Error:

$$\text{Error (\%)} = \left| \frac{V_a - V_e}{V_e} \right| \times 100$$

↑ appeared value      → expected value

Error is defined as the difference between true value and measured value

⊙ Error =  $\left| \frac{\text{True value} - \text{Measured value}}{\text{True value}} \right|$

(Absolute value is obtained of error)  
 Error =  $\left| \frac{T.V - M.V}{T.V} \right| \times 100$

Accuracy & Precision

