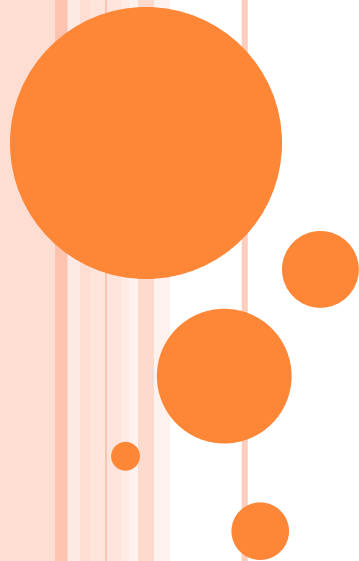


FUNCTIONAL ELEMENTS OF AN INSTRUMENTATION SYSTEM

Dr. V. Karteek

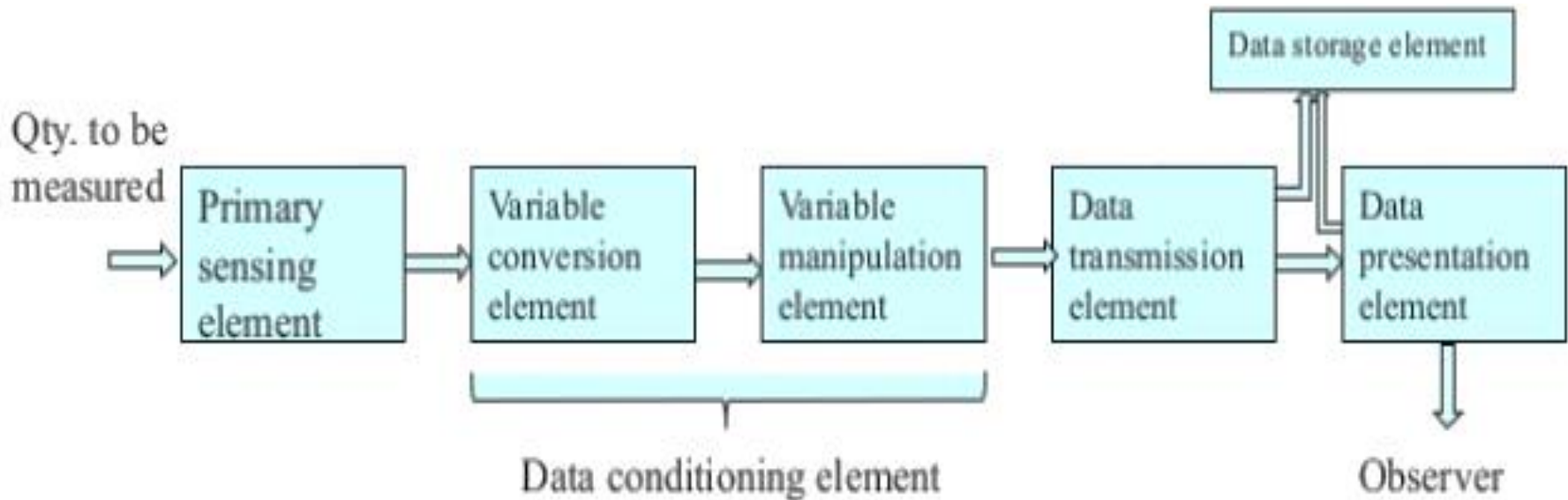
Assistant Professor, EIED

**Thapar Institute of Engineering & Technology
Patiala, Punjab**




FUNCTIONAL ELEMENTS OF AN INSTRUMENTATION SYSTEM

Most of the measurement system contains following main functional elements as shown in figure below:

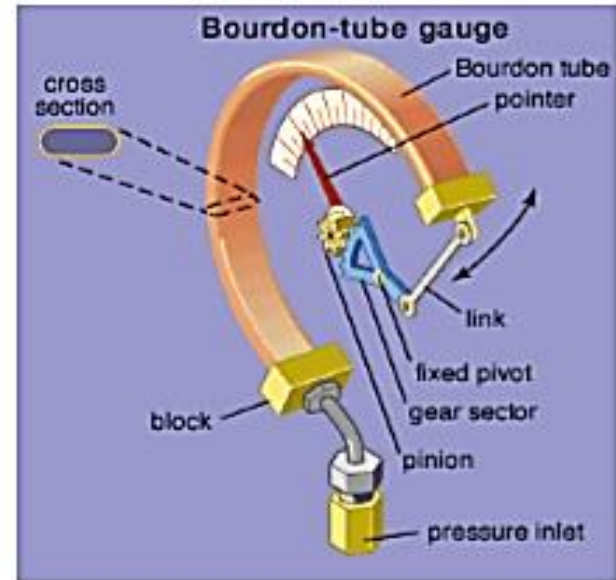
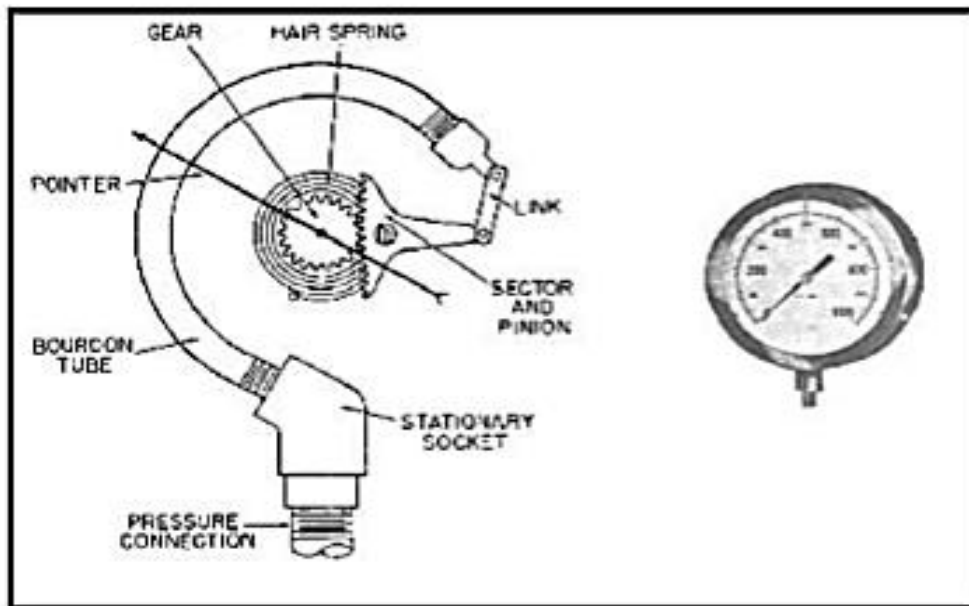


Primary Sensing Element: The functional element which first comes into the contact with physical quantity to be measured. It senses the quantity to be measured. The output is some physical variable (Exa. displacement or voltage).

CONTINUED

- **Variable Conversion Element:** The output of the primary sensing element may be in electrical form or any other physical parameter. Such an output may not be suitable for the actual measurement system. For example if the measurement system is digital then the analog signal obtained from the primary sensing element is not suitable for the digital system. Thus an A/D converter is required which acts as the variable conversion element.
 - **Variable Manipulation Element:** The variable manipulation element manipulates the signal by preserving the original nature of the signal. Hence manipulation like addition/subtraction multiplication etc. have been executed.
 - **Data Transmission Element:** The element which has been used exclusively for data transmission in the instrument or measurement system.
 - **Data Presentation Element:** To represent the final value in terms of numerical reading, scale and pointer or a plot.
- 

FUNCTIONAL ELEMENTS OF A BOURDON PRESSURE GAUGE

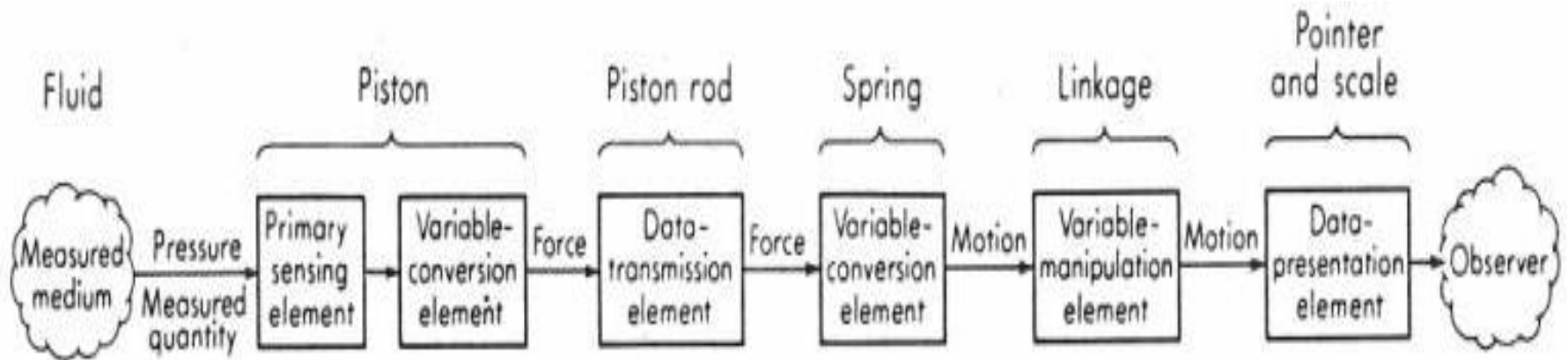
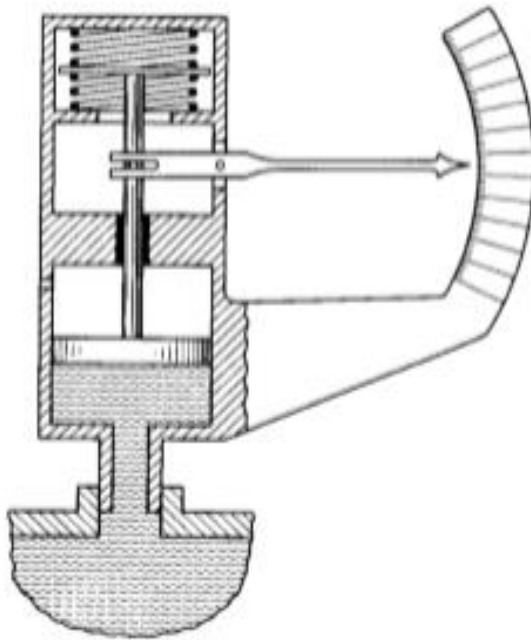


CONTINUED

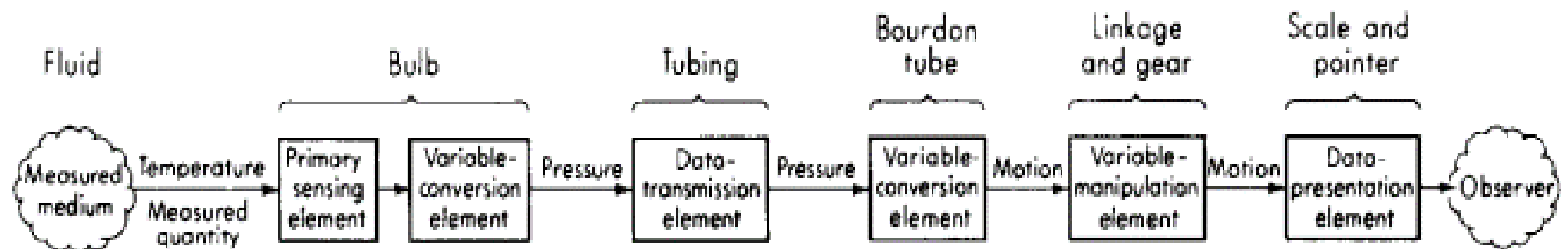
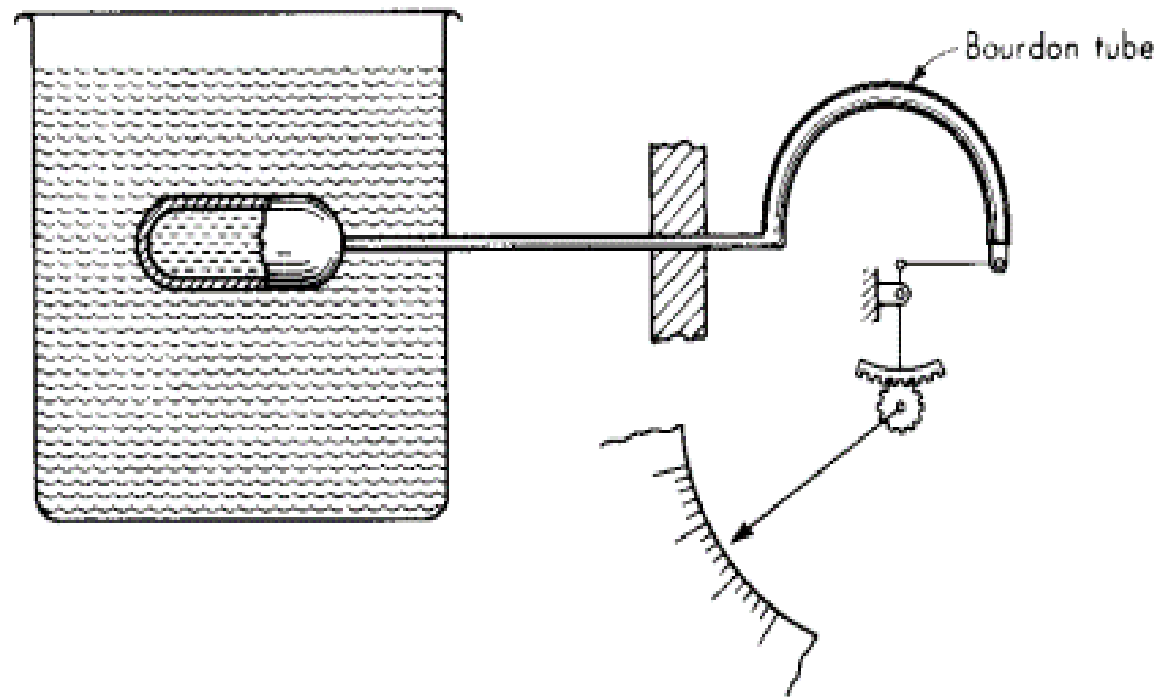
- The Bourdon tube acts as the primary sensing element and a variable conversion element.
 - It senses the input quantity (pressure in this case). On account of the pressure the closed end of the Bourdon tube is displaced. Thus, the pressure is converted into a small displacement.
- The mechanical linkage thus acts as a data transmission element while the gearing arrangement acts as a data manipulation element.
 - The closed end of the Bourdon tube is connected through mechanical linkage to a sector-pinion gearing arrangement. The gearing arrangement amplifies the small displacement and makes the pointer to rotate through a large angle
- The dial scale on the gauge body plays the function of data presentation element
 - it conveys the information about the quantity being measured.



PRESSURE GAGE

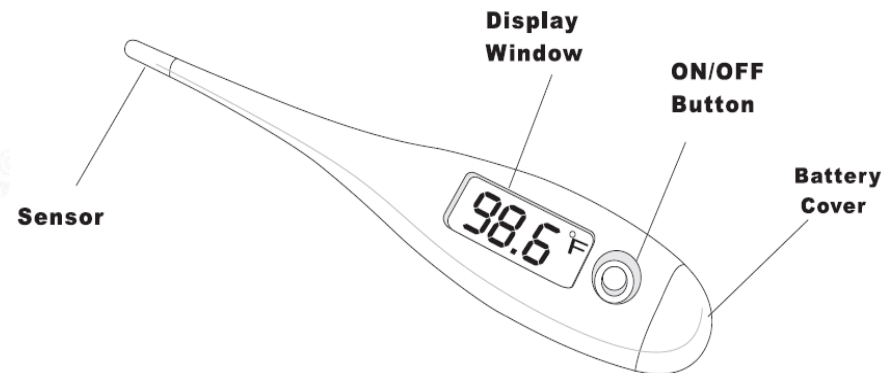
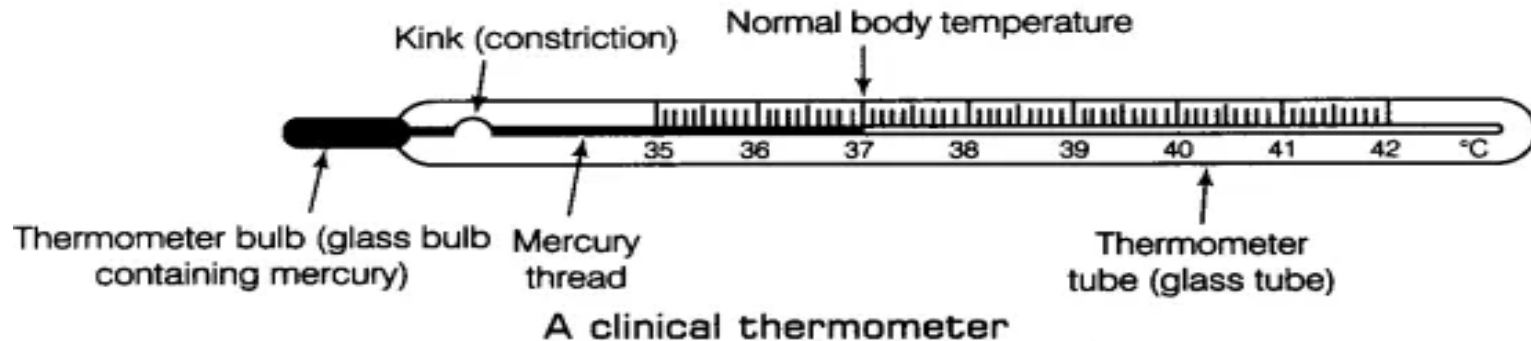


PRESSURE THERMOMETER



MERCURY THERMOMETER

Find out the functional elements of a clinical thermometer



THANK YOU

