

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data if necessary and state it clearly.
4. Use of non-programmable calculator is allowed.

Q.1) Attempt any Two

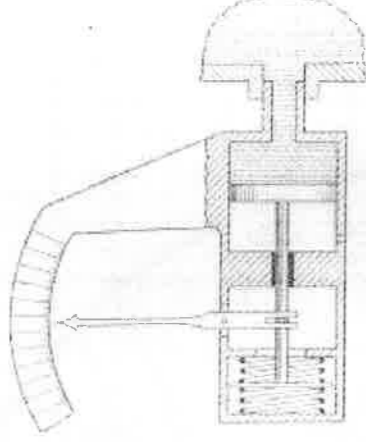
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i) Define sensitivity. A measuring system consist of a transducer, an amplifier and a recorder, and their individual sensitivities are stated as follows:

Transducer sensitivity $k_1 = 0.25 \text{ mV/}^\circ\text{C}$, Amplifier gain $k_2 = 2.5 \text{ V/mV}$, Recorder sensitivity $k_3 = 4 \text{ mm/V}$. What would be the overall sensitivity of the measuring system?

ii) Write down the generalized experimental procedure.

iii) Draw the functional block diagram for a pressure gauge as shown in figure.



Q.2) Attempt any Two

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i) Explain general consideration in data analysis.

ii) The following heat transfer data points are expected to follow a functional form of $N=aR^b$. Obtain the values of a and b from a graphical analysis and also by method of least squares.

R	12	20	30	40	100	300	400	1000	3000
N	2	2.5	3	3.3	5.3	10	11	17	30

iii) A certain length measurement is made with the following results:

Reading	1	2	3	4	5	6	7	8	9	10
x, mm	49.36	50.12	48.98	49.24	49.26	50.56	49.18	49.89	49.33	49.39

Calculate the standard deviation, the mean reading and the uncertainty. Apply Chauvenet's criterion as needed.

