EXPERIMENTAL WORK 1

Subject. Determining the scale division value of a measuring instrument.

Theoretical data and practical advice

The scale division value of a measuring instrument – is the meaning of the smallest division in the scale of the measuring instrument.

In order to determine the scale division value of a measuring instrument one needs to divide the difference between the closest points of the scale by the number of divisions among them. Let us determine division value of the scale No. 1 of a track (gutter), Figure 1:

Figure 1

1. Let us pick two neighboring points indicating length that are stated in the scale, for example, 32 cm and 33 cm, and find the difference between them: 33 cm − 32 cm = 1 cm.
2. Let us determine the number of divisions between the points indicating length, – 10 divisions.
3. Let us divide the obtained difference by the number of divisions: $\frac{1\text{ cm}}{10}$ = 0.1 cm. Therefore, the scale division value equals 0.1 cm: $C_{\text{track}} = \frac{33\text{ cm} - 32\text{ cm}}{10} = \frac{1\text{ cm}}{10}$ = 0.1 cm.
4. Let us determine the division value of the scale No.2 of a track (gutter), Figure 2:

Figure 2

5. Let us pick two neighboring points indicating length that are stated in the scale, for example, 34 cm and 35 cm, and find the difference between them: 35 cm − 34 cm = 1 cm.

6. Let us determine the number of divisions between the points indicating length, – 2 divisions.
7. Let us divide the obtained difference by the number of divisions: $\frac{1\text{ cm}}{2}$ = 0.5 cm. Therefore, the scale division value equals 0.5 cm: $C_{\text{track}} = \frac{35\text{ cm} - 34\text{ cm}}{2} = \frac{1\text{ cm}}{2}$ = 0.5 cm.

Measuring instrument limits are the highest and the lowest value of a physical quantity that may be measured with the help of this measuring instrument. Thus, the upper limit of measuring a track (gutter) in Figure No.1 equals 59 cm, lower limit equals 0 cm. The upper limit of measuring a track (gutter) in Figure No.2 equals 58 cm, lower limit equals 0 cm.

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Target: to determine the measuring limits and the scale division value of different measuring instruments.

Equipment: ruler (track), thermometer, dynamometer, measuring cylinders, graduated flasks.

Figure 3

Execution

1. I'm examining measuring instruments, namely:

2. I’m filling in the first five columns of the table:

Table 1

Name of the instrument	The physical quantity measured with the help of the instrument	Unit of the measured quantity	Marks on the scale of the instrument				
			Numbers indicating two neighboring points	The amount of divisions between the neighboring points indicated by numbers	Scale division value	Measuring limits	
						Lower	Upper

3. I’m determining the measuring limits and the scale division value of the measuring instruments:

4. I’m filling in the rest of the table and analyzing the results of the experiment:

The work was done by the student_____of the _____ grade

The work was checked by the teacher

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