

Surname:

First name:

PMQ2

University of Cape Town
Department of Physics

Physics Measurement Questionnaire 2

Instructions:

Write your name in the box above.

Inside this envelope there are pages numbered 1 to 10.

Read the text below and answer the questions on each sheet.

If you need more space for your answers, then use the backs of the sheets.

It should take you about 5 minutes to answer each question.

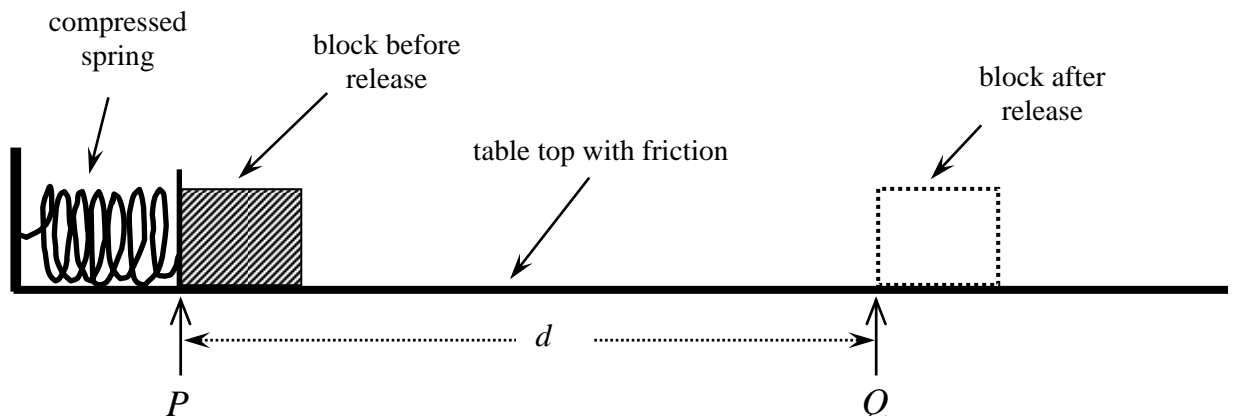
Answer the questions in order and do not skip any sheet.

When you have completed a question, put the sheet inside this envelope and do not take it out again, even if you want to change your answer.

Note: It is possible that some answers may be similar or exactly the same as others. Please write all answers out in full, even if you feel that you are repeating yourself.

Context:

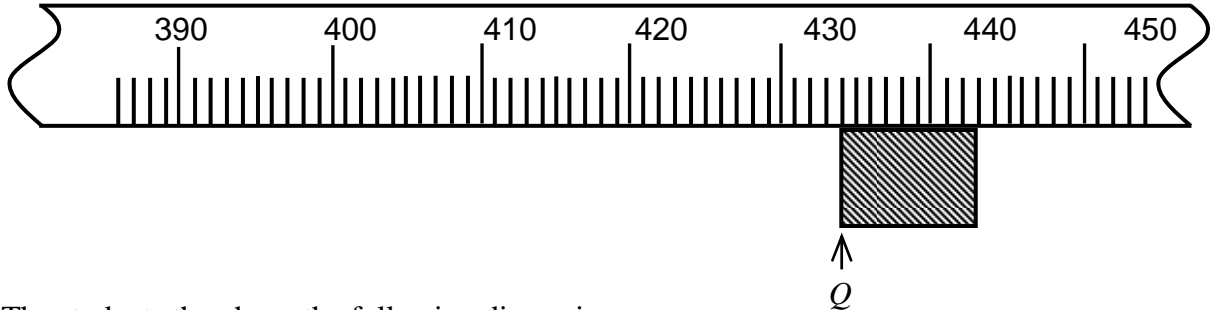
An experiment is taking place in the physics laboratory to investigate the motion of a block on a table with friction. The block is pushed against the spring so that its left edge is at position P . The block is released and travels a distance d to position Q as shown. The students, working in groups, have to determine d using a metre rule that is provided.





Q 1. (SAG/2)

One of the groups marks point P and *carefully* lines it up with the zero mark on the metre rule. They then release the block. After the block comes to rest they see that point Q lines up on the metre stick as shown.



The students then have the following discussion.

I think that the distance d is exactly 434.0 mm.

I think that the distance d the is approximately 434.0 mm.

I think that the distance d is between 433.0 and 435.0 mm.

I think that the distance d is exactly 434 mm.

I don't agree with any of you.

A B C D E

With whom do you most closely agree? (Circle ONE):

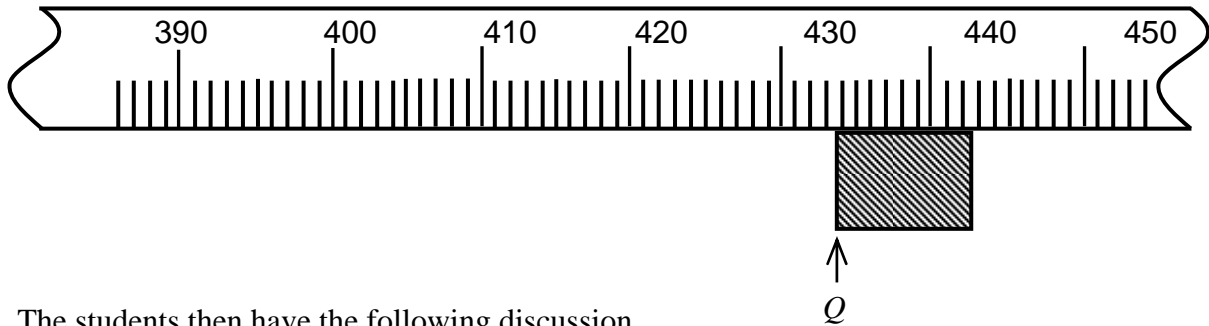
A	B	C	D	E
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Explain your choice.








Q 2. (SAB/2)

A second group of students marks point P and *carefully* lines it up with the zero mark on the metre rule. They then release the block. After the block comes to rest they see that point Q lines up on the metre stick as shown.



The students then have the following discussion.

I think that the distance d is <u>exactly</u> 433.8 mm.	I think that the distance d is <u>approximately</u> 433.8 mm.	I think that the distance d is <u>between</u> 433.0 and 434.0 mm.	I think the distance d is <u>approximately</u> 434.0 mm.	I don't agree with any of you.
				
A	B	C	D	E

With whom do you most closely agree? (Circle ONE):

A	B	C	D	E
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Explain your choice.

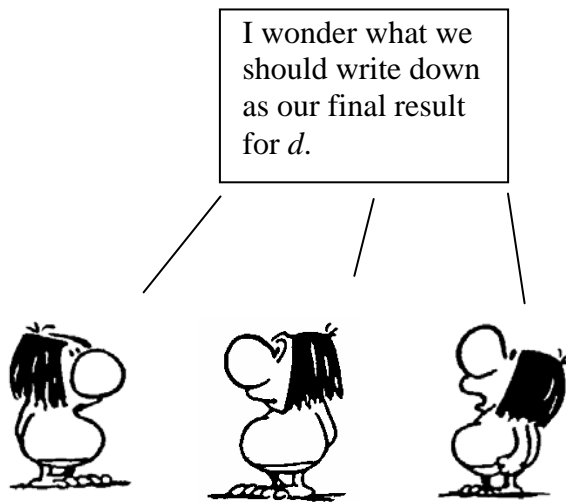


Q 3. (UR/2)

A third group of students releases the block 5 times from point P . The 5 values they obtain for d are shown below.

<u>Release</u>	<u>d (mm)</u>
1	434.5
2	426.6
3	435.8
4	432.0
5	431.1

The students then discuss what to write down as their final result for d .



Write down what you think the students should record as their final result for d and explain your answer.



Q 4. (UA/2)

One of the students in the last group decides to calculate the average of their readings for d , which turns out to be 432.0 mm.

<u>Release</u>	<u>d (mm)</u>
1	434.5
2	432.0
3	435.8
4	426.6
5	<u>431.1</u>
Average:	432.0

They then discuss what they can say about d .

Student A: I think that d is exactly 432.0 mm.
 Student B: No, I think that d is approximately 432.0 mm.
 Student C: I think that d is somewhere between 431.5 and 432.5 mm.
 Student D: No, I think that d is somewhere between 426.6 and 435.8 mm.
 Student E: I don't agree with any of you.

With whom do you most closely agree? (Circle ONE):
Explain your choice.

A	B	C	D	E
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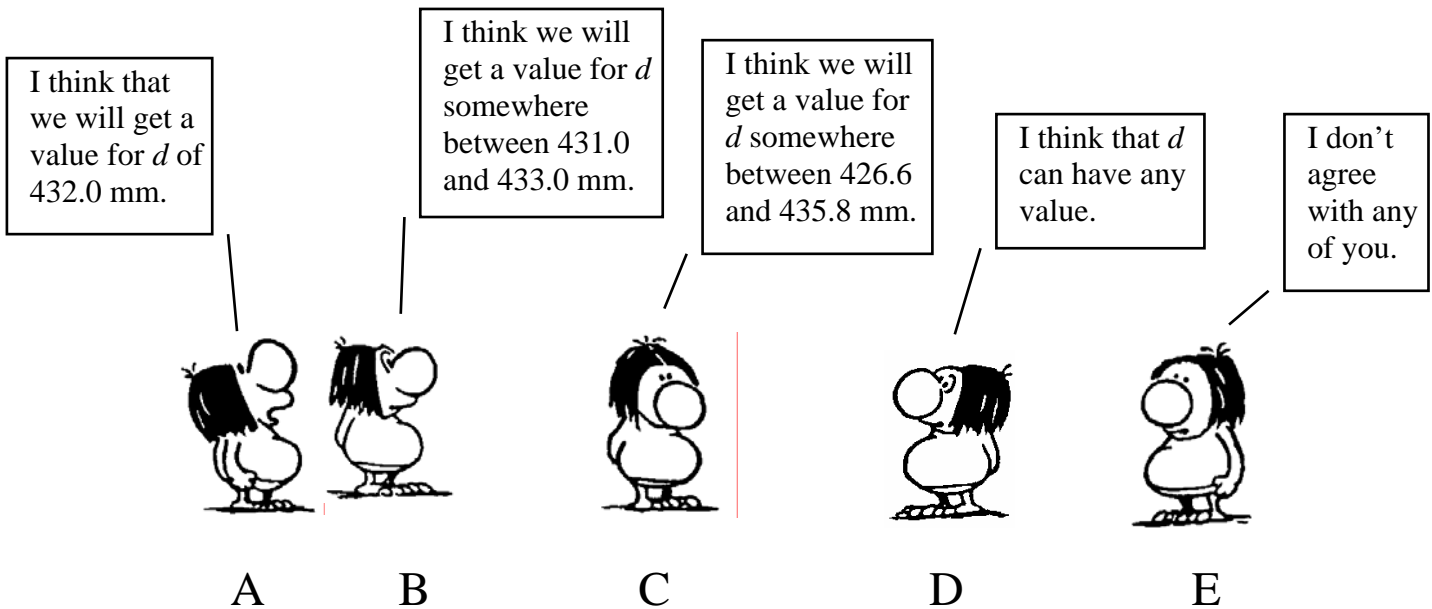
Q 5. (UAA/2)

The 5 values for d as shown below are the same as in the last question, i.e. obtained by the second group.

<u>Roll</u>	<u>d (mm)</u>
1	434.5
2	432.0
3	435.8
4	426.6
5	<u>431.1</u>

Average: **432.0**

The students now discuss what value they will get for d if they release the block again (for the sixth time) from point P .



With whom do you most closely agree? (Circle ONE):

A	B	C	D	E
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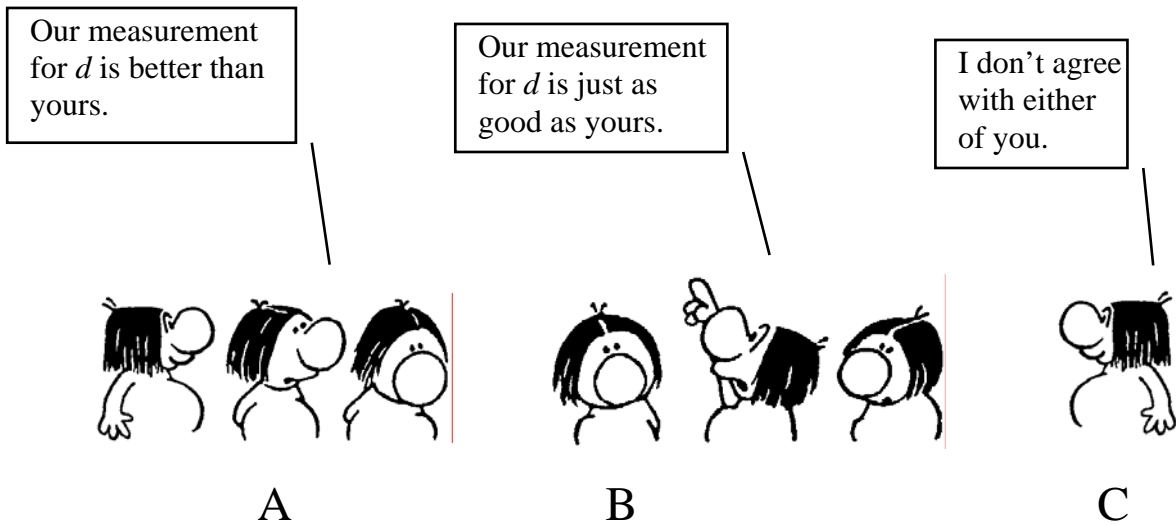
Explain your choice.



Q 6. (SMDS/2)

Two groups of students, both of whom had decided to release the block 5 times from point P , compare their measurements for d . Their values for the five releases are shown below, together with their averages.

<u>Release</u>	<u>Group A</u> <u>d (mm)</u>	<u>Group B</u> <u>d (mm)</u>
1	443.3	446.8
2	432.8	459.4
3	424.4	410.5
4	439.6	423.3
5	<u>434.9</u>	<u>435.0</u>
Average:	435.0	435.0



With whom do you most closely agree? (Circle ONE):

A	B	C
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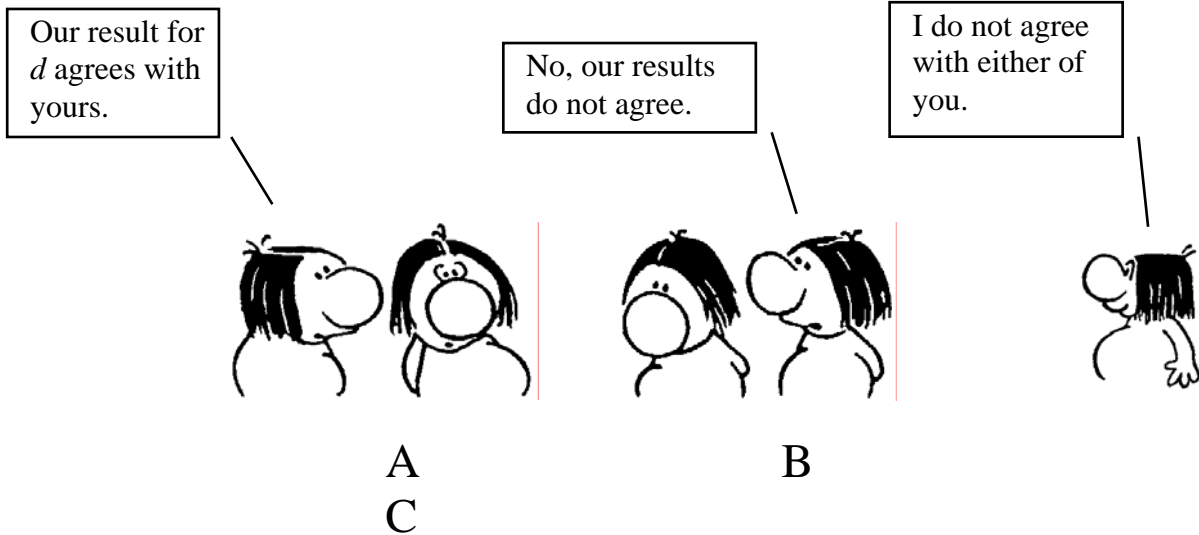
Explain your choice. Do not use the word “results or measurements” in your explanation: state clearly if you are referring to the “data values”, the “average”, etc.



Q 7. (DMSS/2)

Two other groups of students compare their measurement of d . Their values for five releases are shown below, together with their averages.

<u>Release</u>	<u>Group A</u> <u>d (mm)</u>	<u>Group B</u> <u>d (mm)</u>
1	439.5	435.6
2	438.4	439.2
3	433.1	428.0
4	422.8	433.1
5	<u>431.3</u>	<u>438.3</u>
Average:	433.0	434.8



With which group do you most closely agree? (Circle ONE):

A	B	C
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Explain your choice. Do not use the word “results or measurements” in your explanation: state clearly if you are referring to the “data values”, the “average”, etc.



Q 8. (SD/2)

The lecturer now comes around with a special electronic meter which has a digital display and uses it to measure d . Here is what the electronic meter shows:



After recording the reading and the lecturer has gone, the following discussion takes place between the students.

Good, we now know that d is exactly 433.0 mm.

No, I think that we now know that d is approximately 433.0 mm.

I think that d is between 432.5 and 433.5 mm.

I think that d is between 431.0 and 432.0 mm.

I don't agree with any of you.

A B C D E

With whom do you most closely agree? (Circle ONE):

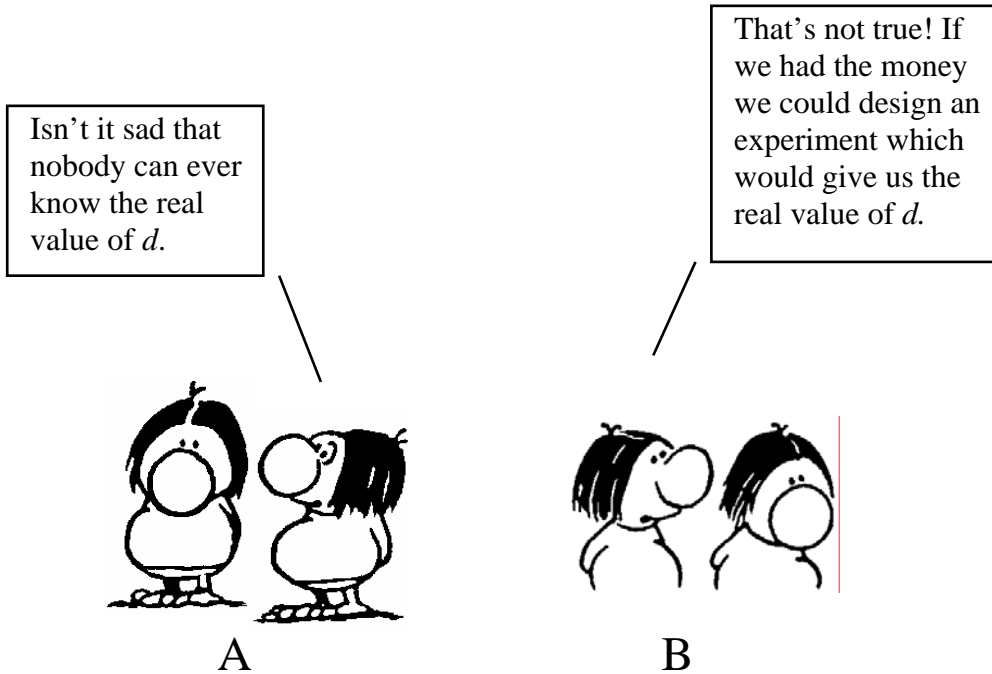
A	B	C	D	E
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Explain your choice.



Q 9. (UU/2)

The students continue to discuss the experiment.



With which group do you most closely agree? (Circle ONE):

A	B
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Explain your choice.



Q 10.

Comments.

Are there any answers to the previous question sheets that you want to change?

Please do not remove any sheets from the envelope.

What was the question about and how do you want to change your answer?



Any other comments?



In this laboratory questionnaire, I thought that the cartoon figures were (tick one):	male	female	mixed gender
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