P6 Summary

1. Significant Figures有效数字

Measurements 测量 !!先看最小间隔代表多少!!

Metre rule: **1mm**; angle 1°; T, V or I might have half reading

(a) (i) Using Fig. .2, record the student's readings.

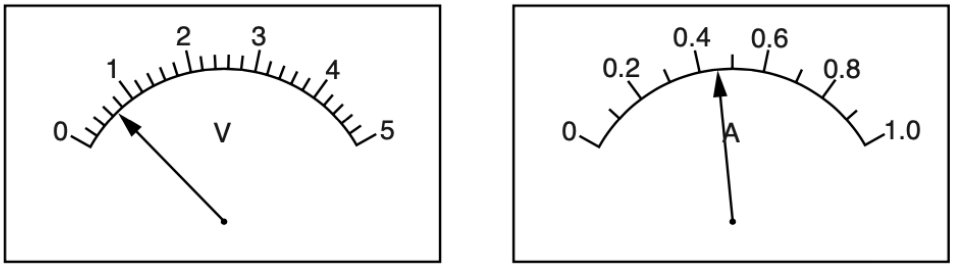


Fig. 8.2

V_1 = ...

I = ...

[2]

Measure and record, in Table 3.1, the height of the image of the triangle h_I on the screen, as shown in Fig. 3.2. [1]

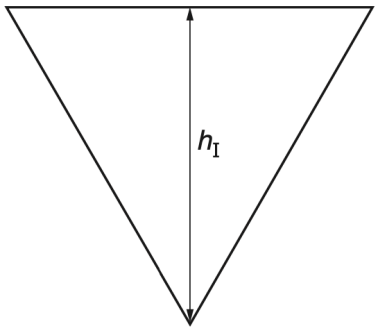


Fig. 3.2

Table 3.1

u/cm	h_I/cm	M
20.0		
25.0	2.25	
35.0	1.10	
45.0	0.75	
55.0	0.55	

Calculation in tables计算(!!!column heading units!!!)
格式和已给数据统一，**至少两位**有效数字

x/	V/	I/	R/
10.0	0.20	0.33	
30.0	0.60	0.33	
50.0	1.01	0.32	
70.0	1.41	0.33	
90.0	1.81	0.33	

2. Precaution of measuring vertical length测量竖直高度
Use of set square to ensure rule is vertical
Eye level with scale to avoid parallax error
Clamp rule
Rule close to the object

3. How to make sure a line is horizontal
Use set square measure two ends make sure they are the same

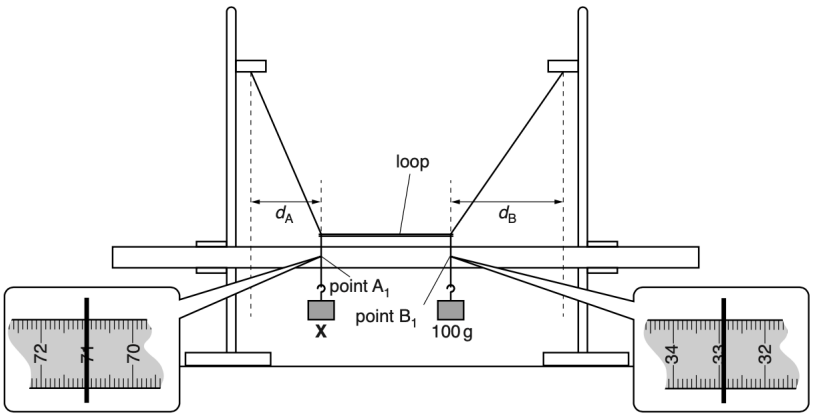


Fig. 2.2

(d) Explain how you could ensure that the loop is horizontal in **(b)**. You may draw a diagram.

Use set square to measure the height of two ends from the bench, make sure they are the same;
Use of spirit level

4. Precautions while measuring the temperature of liquid

- avoid thermometer touching the bottom/wall of beaker;
- stir before measuring,
- wait until reading stop rising at the start;
- view scale reading perpendicularly to avoid parallax error

5. Lens experiment: precautions to obtain reliable results

- Move screen backwards and forwards slowly to get sharpest image
- Make sure lens, object and screen are vertical
- Center of lens and object same vertical height from bench
- Darkened room/brighter lamp/no other lights
- Clamp rule on bench

6. Support or not support

- Support:

the difference between two values are within limit of experimental accuracy:

$\frac{20-19}{20} = 5\,\% < 10\,\%$ (!!!一定要算!!!)

- Not support:

Two values 20 and 19 are not equal

The student calculates the average value θ_{av} of all his values for θ.

θ_{av} = ...20°.....

He suggests that θ_{av} should be equal to α. State whether the results support this suggestion. Justify your statement by reference to the results.

statement .....

justification .....

.....

.....

[2]

7. Justification 一定要refer to the results 提到题中数据!

	thermometer bulb near the bottom of the beaker	thermometer bulb near the surface of the water
t /	θ /	θ /
0	82.0	76.0
	79.5	74.0
	77.0	72.0
	75.0	70.0
	73.0	68.0
	70.5	66.0
	69.0	64.5

(c) State in which position of the thermometer bulb the average rate of cooling is the greater.

Justify your answer by referring to the results.

position .....

justification .....

.....

.....

[2]

Near bottom

Temperature rise per unit time greater near bottom of the beaker, $\frac{23.0}{6} > \frac{11.5}{6}$(一定要写)

8. Investigation

(e) A student suggests that d_A and d_B might be directly proportional to each other.

Briefly describe how this experiment could be extended to investigate the suggestion.

.....

.....

.....[2]

Repeat experiment with different (size of loops)to get difference (values of dA, dB), at least 3 sets of results, plot a graph (dA against dB) check if it is a straight line

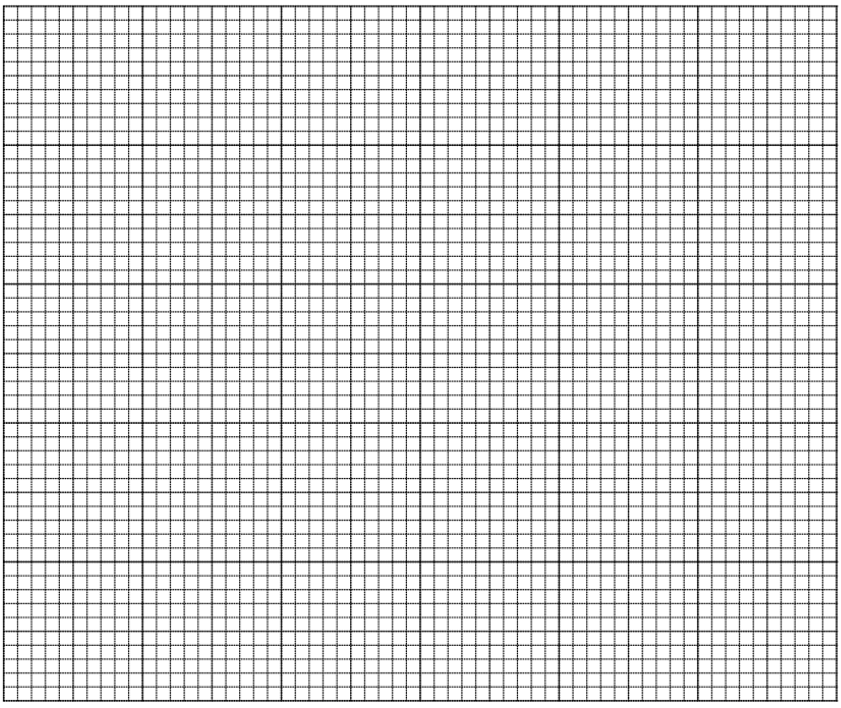
3. Plot a graph画图

Axises(units), arrows, suitable scale, origin (usually not from 0,0), data points marked by small cross, 线要出头，line exceeds 1/2 graph，至少两个点在线上，剩下的点均匀分布直线两侧

CaLculate gradient G
选两个点画三角形，三角形范围要超过1/2直线，代入数据（有效数字跟图中一样）计算

x/	*V*/	*I*/	*R*/
10.0	0.20	0.33	
30.0	0.60	0.33	
50.0	1.01	0.32	
70.0	1.41	0.33	
90.0	1.81	0.33	

(b) Plot a graph of *V*/V (*y*-axis) against *R*/Ω (*x*-axis).



[5]

(c) Determine the gradient *G* of the graph. Show clearly on the graph how you obtained the necessary information.

G = ...[3]

Experimental Planning

(1')Define:

Vary A（independent variable，measure B(dependent variable)(看第一句话)

Control variable: keep … constant

(1')Apparatus： e.g. 测长度: meter rule, 测温度: thermometer, 测角度: protractor, 测质量: balance, 测液体体积: measuring cylinder, 测时间: stopwatch

(2-3')Process:

1,

2, repeat the procedure and take an average

3, repeat experiment with different (independent variable) at least 5 times

(2')Analysis:

Table: (heading unit不要忘!!)

	A/unit	B/unit
1		
2		
3		
4		
5		

(1')Conclusion:

Plot a graph of B against A/compare B and A to see if there is an effect

Common additional points:

repeat the procedure/measurements and take an **average**

At least **5** sets of data taken