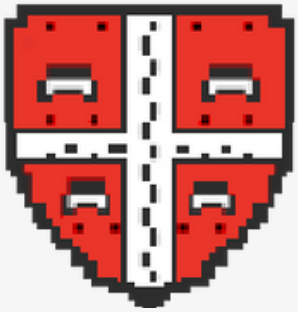

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Paper 6 Tips and Strategies for Cambridge IGCSE

Physics (0625)

Authored by

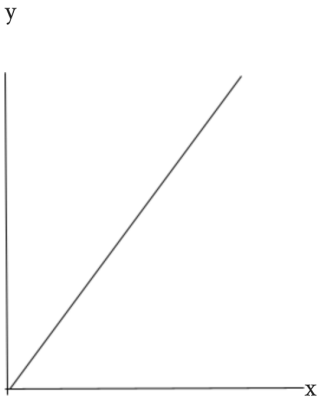
Kush

1st edition, for examination until 2025

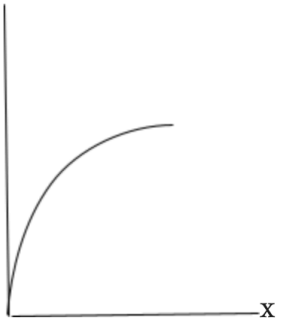
Graphs

- Give the graph a title
- Draw and label the x and y axis
- Ensure that the scale is shown clearly
- Ensure that the graph covers more than half of the graph sheet

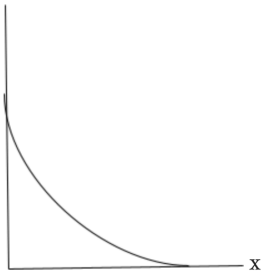
y is directly proportional to x



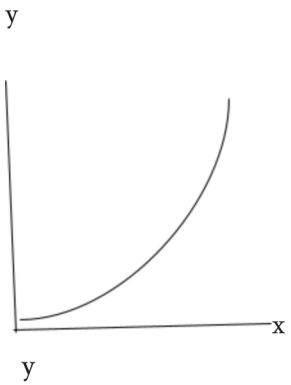
When x increases, y also increases at a decreasing rate



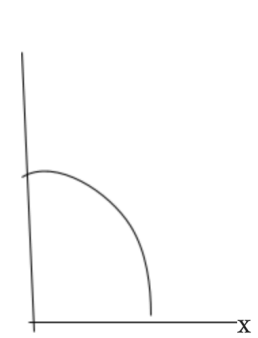
When x increases, y decreases at a decreasing rate



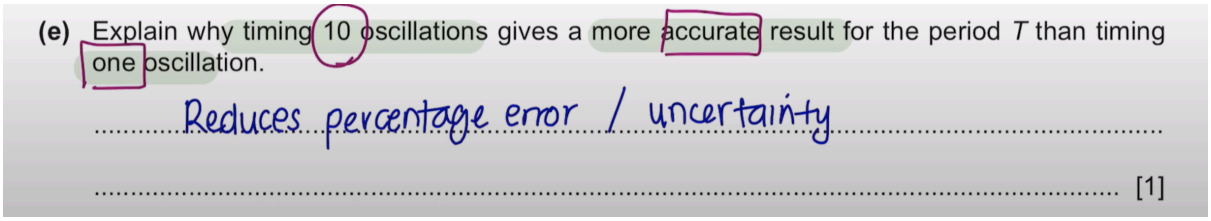
When x increases, y increases at an increasing rate



When x increases, y decreases at an increasing rate



Why do we take multiple readings when using a stopwatch?
It reduces the random error and increases the accuracy of the results by finding the average. Example:


(e) Explain why timing 10 oscillations gives a more accurate result for the period *T* than timing one oscillation.

Reduces percentage error / uncertainty

..... [1]

How do we improve accuracy of pendulum results?
Increase the number of oscillations and find the average. Mark the center of the pendulum bob to measure accurately.

Lenses experiment sources of error
There exists a small range of distances for which the image is still in focus which may lead to an uncertainty in the measurement of the focal length. To improve, take more readings and then find the average.

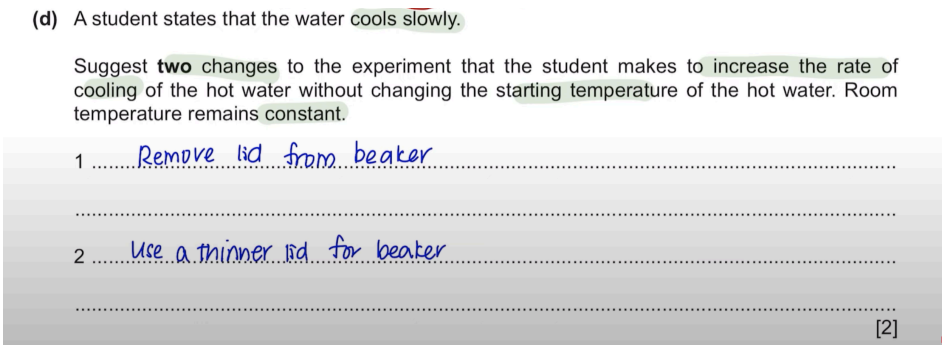
Thermal energy experiment sources of error
Some of the thermal energy is given out to the surroundings, the heat source heats up the instrument along with the material intended to be heated too and thermal energy is lost through the evaporation of water.

Improvements:
Include the mass and the specific heat capacity of the beaker/whatever instrument that is not intended to be heated up in the calculation as that instrument is being heated up and is absorbing thermal energy too.

Cover the beaker with a lid and place the thermometer through the lid. This is to reduce thermal energy loss by the evaporation of water.

Place the styrofoam cup in a beaker to provide thermal insulation and prevent the loss of thermal energy.

Example of thermal energy question:



(d) A student states that the water cools slowly.

Suggest **two** changes to the experiment that the student makes to increase the rate of cooling of the hot water without changing the starting temperature of the hot water. Room temperature remains constant.

1 Remove lid from beaker

2 Use a thinner lid for beaker

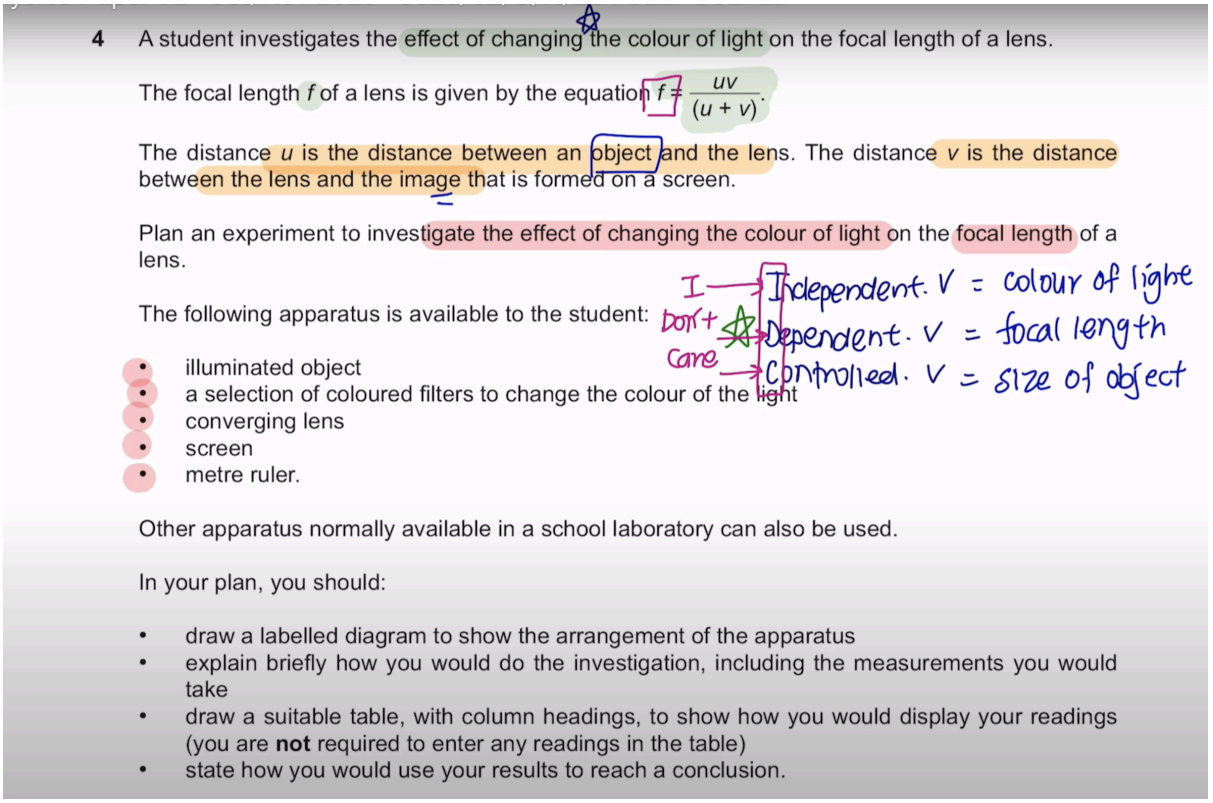
[2]

How to approach planning questions?

1. State the independent, dependent, and controlled variables.
2. Briefly describe the experiment.
3. Explain how each variable varies.
4. Explain how data is recorded.
5. Remember to take multiple readings and then find the average.

6. State what graph has to be plotted.
7. State how to find the variables that the question asked for.

Example of planning question:



4 A student investigates the effect of changing the colour of light on the focal length of a lens.

The focal length f of a lens is given by the equation $f = \frac{uv}{(u + v)}$.

The distance u is the distance between an object and the lens. The distance v is the distance between the lens and the image that is formed on a screen.

Plan an experiment to investigate the effect of changing the colour of light on the focal length of a lens.

The following apparatus is available to the student:

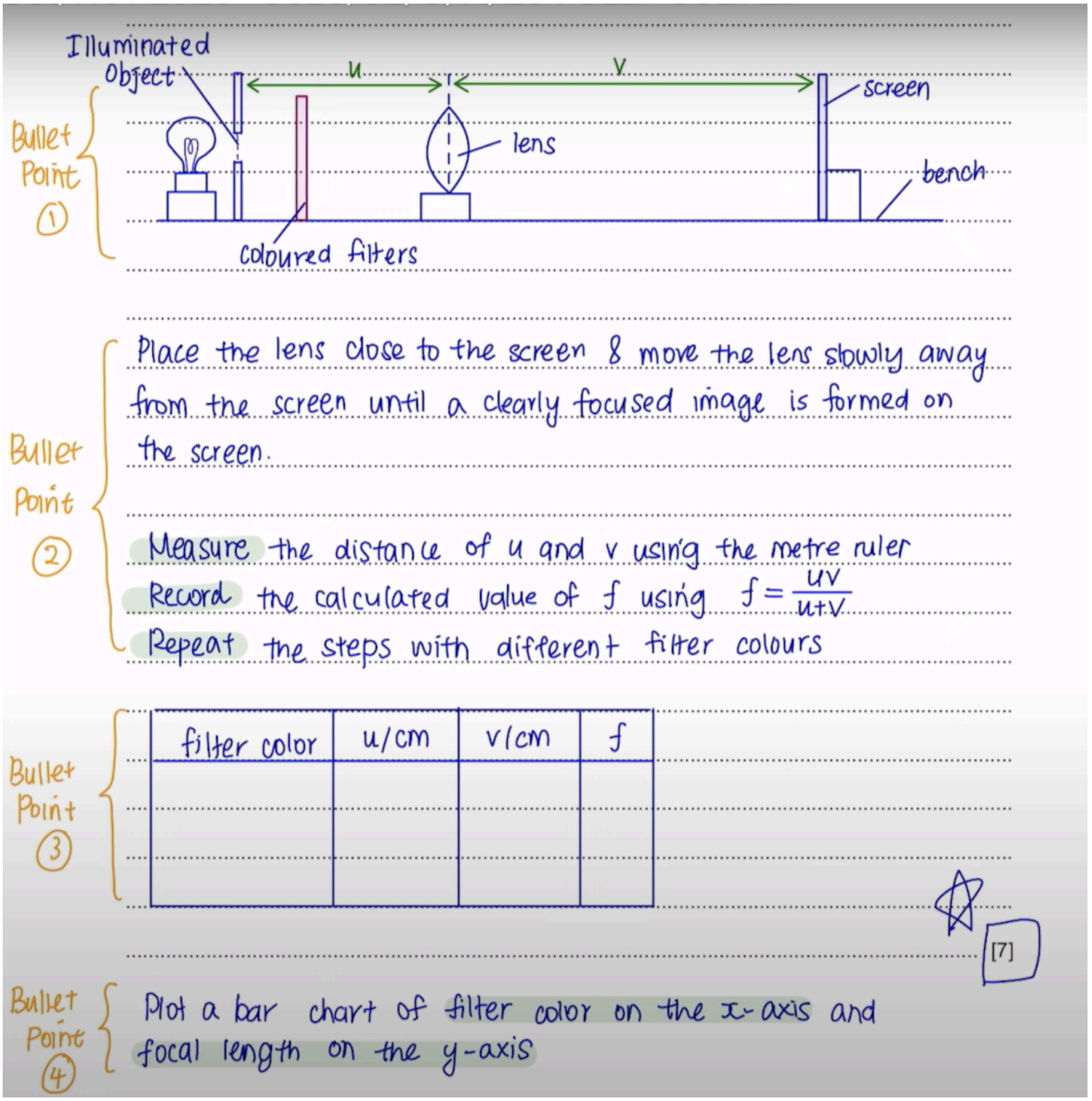
- illuminated object
- a selection of coloured filters to change the colour of the light
- converging lens
- screen
- metre ruler.

Other apparatus normally available in a school laboratory can also be used.

In your plan, you should:

- draw a labelled diagram to show the arrangement of the apparatus
- explain briefly how you would do the investigation, including the measurements you would take
- draw a suitable table, with column headings, to show how you would display your readings (you are **not** required to enter any readings in the table)
- state how you would use your results to reach a conclusion.

Answer:



Improvements for mass related experiments:

1. Mass should be taped to the ruler to ensure that the mass does not move during the experiment.
2. The mass could be replaced with a mass with a clearly defined center of gravity so all data can be clearly measured.

Precautions for experiments with oscillation:

- Wait for a few seconds before starting the stopwatch and measuring the time for the needed number of oscillations.
- Use an optical pin / blu tack as a fiduciary point when measuring the oscillations.

Precautions for lenses experiment:

- Carry out the experiment in a dark room.
- Use a set square to make sure the screen is vertical.
- Move the lens back and forth until you have a focused image.
- When using pins, make sure they are as far apart as possible.
- View the pins with one eye.
- View the pins from the bases for more accuracy.

Precautions for voltmeter/ammeter experiment:

- Take readings multiple times and take average.
- Check for zero error before starting to get correct reading.
- Look perpendicular to the scale to avoid parallax error.

Precautions for thermometer (heating experiment):

- Insulate the beaker to prevent heat loss.
- Stir to ensure water temperature is the same throughout the experiment.
- Use a lid to reduce heat loss.
- Repeat and take average.

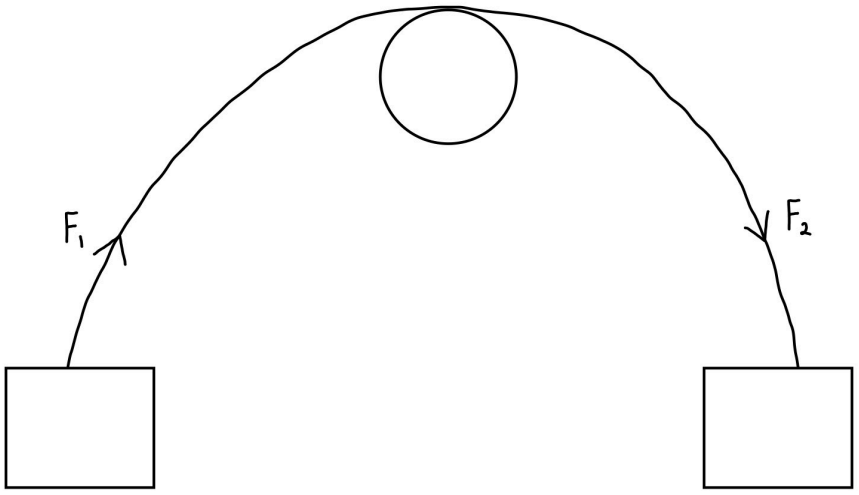
Possible causes of inaccuracy while measuring angles of reflection:

- Thickness of lines.
- Thickness of pins.

- The protractor gives readings to the nearest degree.
- Base of the pins might be tilted.
- Thickness of the mirror.

Technique to obtain an image that is in sharp focus:
Approach the formation of the sharp image on the screen from both directions.

Explain why neither F1 or F2 is equal to the weight of the mass on the string.



There is friction between the tube and the rope. Additional force is introduced between the tube and the rope and hence, f1 and f2 are not equal to the weight of the mass on the string.

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Acknowledgments and Information:

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