GRESHAM'S

SCIENCE - Sample Paper

45 minutes

Write your name in the space provided.

CANDIDATE NAME:

SCORE:

FINDING THE EFFECT ON MASS ON THE PERIOD OF AN OSCILLATING SPRING

Information:

- One period of oscillation is the time taken from the lowest point in the oscillation to the highest and back to the lowest. It is also the time from centre up and back to centre and down and back to centre.
- The uncertainty in starting and stopping a stop watch is about 0.3 second. This can lead to large uncertainties in the period if short times are measured. It is known that the period is not affected by the amplitude of the oscillation, only by the mass being used on the spring

Apparatus

Clamp and stand, spring, 50g mass hanger and 9 x 50g masses, stop clock/watch

You should also have pencil, ruler and a calculator.

Read the instructions below and carry out the risk assessment which follows before you start the experiment.

INSTRUCTIONS

a. The apparatus will be set up for you with the spring supported by the clamp and stand and with 500g hanging on the end of the spring.

b. Pull the mass down about 5cm and release. Measure the time for 20 oscillations.

c. Repeat twice so that you have 3 readings.

d. Find the average time and then the period for one oscillation.

e. Change the mass to 450g and repeat steps b and c to find the period.

f. Continue reducing the mass and repeating steps b and c until only the hanger is left.

g. Plot a graph of period against mass

Risk Assessment

What are the hazards involved in this experiment? State one hazard and how it could result in an injury. What you can do to minimise it? [3]

Hazard and how it could result in an injury:

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How risk can be minimised:

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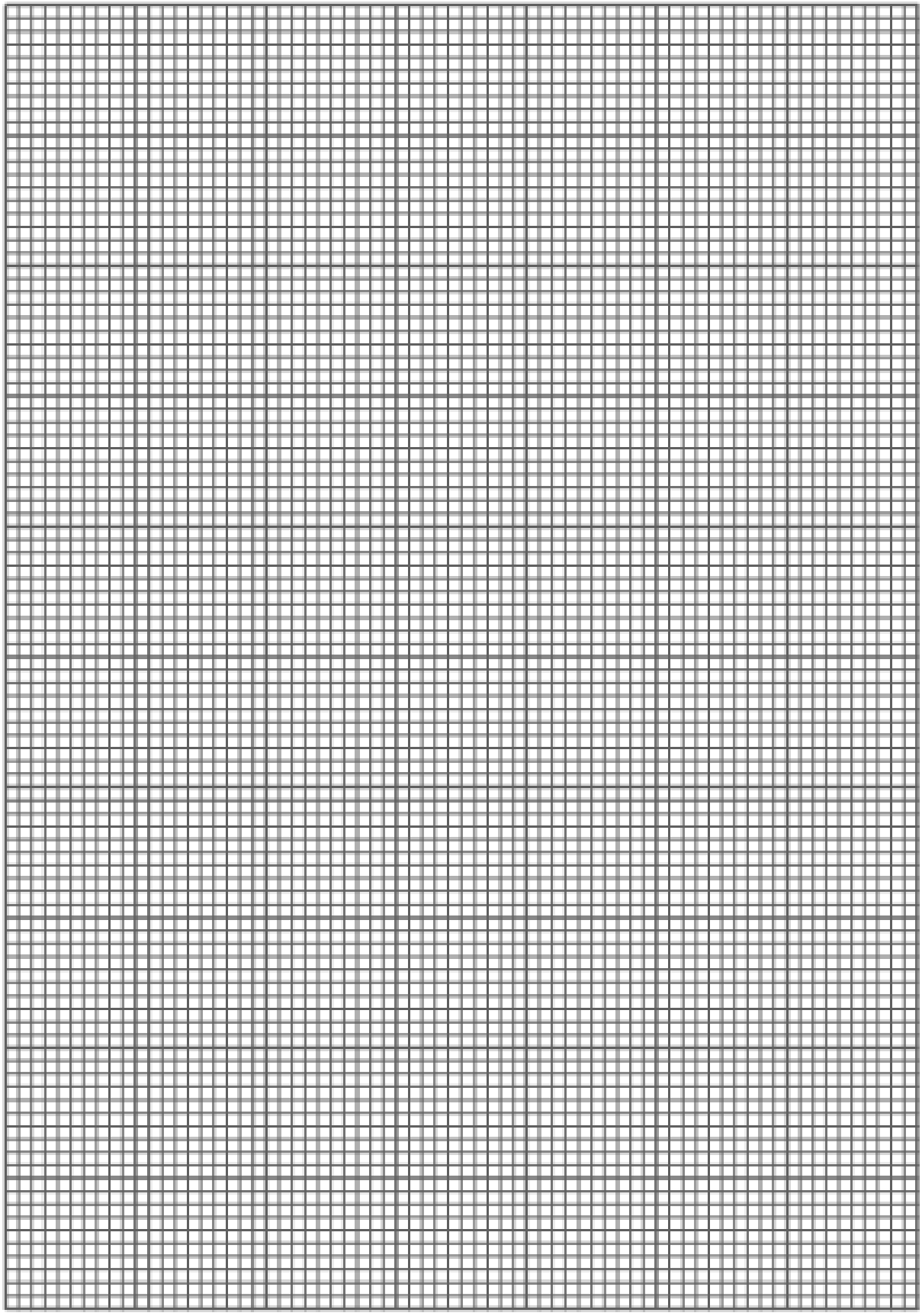
NOW CARRY OUT YOUR EXPERIMENT [3]

If you think that the equipment is faulty ask a teacher for help.

Make a rough record of your measurements below, as you make them.

Present your results in an orderly way in the space below. [5]

Display the results on the grid below [4]



Describe the relationship that is shown by the graph [2]

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What is the main source of error in the experiment? [3]

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Why was the time for 20 oscillations measured, rather than just for one oscillation?

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The period of an oscillating pendulum is found to depend on its length by the equation

$$T^2 = \frac{4\pi^2 L}{k}$$

T = the time period

L = the length

k= a constant

If the period is measured in seconds and the length is measured in metres, then the constant here in Holt is found to be 9.83

The same experiment done at the South Pole gave 9.94 and at the equator, 9.72

Calculate the length of a pendulum in Holt which will have a period of 1 second and suggest the effect this length had on the design of pocket watches.

[5]

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