Name: _____

St Aloysius' College

YEAR 11
PHYSICS
Practical exam

Time Allowed: 70 minutes
[Plus 5 minutes' reading time]

TOTAL MARKS: 55

DIRECTIONS TO CANDIDATES

There are three tasks to complete. They are **not** of equal value and will not take equal time, but they must be completed in order. You will not be given part B until you have finished and handed in Part A and similarly for Part C.

Task A: This task requires you to design an experiment.

Task B: This task requires you to carry out an investigation and assesses you on the accuracy of your results and the presentation of these results.

Task C: This task requires you to analyse data collected in an experiment. You will be assessed on your analysis of the data.

N.B. You may at any time ask for a hint by raising your hand. However, each hint will cost you one mark from your total mark (this cost, will be at the discretion of the teacher).

BACKGROUND INFORMATION

A simple pendulum consists of a small 'bob' on the end of a lightweight string, freely swinging back and forth below a fixed point, as in the diagram below.

The period of a pendulum is the time (in seconds) taken for one complete back and forth swing.
The amplitude of the swing is the maximum sidewards displacement of the bob, usually measured as an angle.

Name: _____

Task A Designing an experimental procedure.

Total marks: 20

Your task is to design an experiment to determine which of the following variables affect the period of a pendulum:

- The length of the pendulum
- The mass of the pendulum
- The amplitude of the swing

Materials supplied

- String
- Slotted 50 g masses
- Mass carrier
- Stopwatch
- Retort stand, boss head and clamp

Method:

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Name: _____

Task B Data Collection.

Total marks: 20

Instructions

1. Read the sheet carefully
2. Draw up a table for your results
3. Carry out the experiment and record your results in this table

Materials

- Pendulum bob
- String
- Stopwatch
- Retort stand, boss head and clamp
- Cork with split in side
- Metre rule

Method:

1. Insert string into split in cork and insert cork into clamp so it is loosely held.
2. Adjust the length of the pendulum so that the distance from the bottom of the cork to the middle of the pendulum bob is 1.00 m. Tighten the clamp so the string is firmly held and won't slip.
3. Set the pendulum swinging by lifting the bob to the side (about 20^{o}) and releasing.
4. Time 10 complete swings and record your results in the table.
5. Repeat this twice more (to give a total of three trials)
6. Change the length of the pendulum to 80 cm and repeat steps 2 to 4.
7. Change the length of the pendulum to 60 cm and repeat steps 2 to 4.

Name: _____

Task C: Data analysis

Total Marks /15

A Physics student on the planet of Xenos performed an experiment similar to the experiment you performed in Part B. Their results are presented in the table below.

l (Length of pendulum in metres)	Average Period (T) (seconds)	T^2	$\sqrt{T}$
0.0	0		
0.2	0.96		
0.4	1.36		
0.6	1.67		
0.8	1.93		
1.0	2.16		

1. Calculate the values for T^2 and $\sqrt{T}$. Write these numbers in the appropriate spaces.
2. For this set of data, which of the following graphs will produce a straight line?
   - *l* versus T
   - *l* versus T^2
   - *l* versus $\sqrt{T}$

3. Graph this set of data (put l on the y axis)
4. The formula for the period of a pendulum is

$$T = 2\pi\sqrt{\frac{l}{g}}$$

Use this formula and the gradient from your graph to calculate the value of g on the planet Xenos. Show all your working and explain your logic.

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