

PHYS 1001 - PHYSICS 1 (REGULAR)

Sample Laboratory Skills Test

Total marks for sample test is 20.

It should take you about 40 minutes to complete this test under exam conditions.

You will need pen, paper and calculator to do the test.

The solutions to this Test can be found on the unit WebCT site under the *Experimental Physics Lab* and *Past Examination Papers* links

Question 1

Estimate the length of the Sydney Harbour Bridge that lies between the pylons. Give your answer in metres and give a justification for your answer.

(2 marks)

Question 2

The weight of a box was recorded as 1200 N. How many significant figures are in this value?

(2 marks)

Question 3

The dimensions of A4 paper are 2.10×10^2 mm by 2.97×10^2 mm.

The paper was quoted by the manufacturer to be 8.0×10^1 g.m⁻².

What is the mass of a single page of the A4 paper?

Your answer has to be expressed in grams and to the correct number of significant figures.

(2 marks)

Question 4

Pat, whose weight is (650 ± 35) N, is lying on Bondi beach with (0.3 ± 0.1) m² of Pat's body in contact with the beach. How much pressure does Pat exert on the sand? The uncertainties shown are standard errors of the mean (SEM). Your answer needs to include the value of the pressure and the SEM.

(2 marks)

Question 5

You want to measure the density of a liquid. The volume measurement is 2.43×10^{-4} m³ and the uncertainty is estimated to be $\pm 5\%$. The mass of the liquid is 3.4×10^{-4} kg and its uncertainty is estimated to be $\pm 1\%$. What is the density of the liquid and its uncertainty expressed as a percentage and a value?

(2 marks)

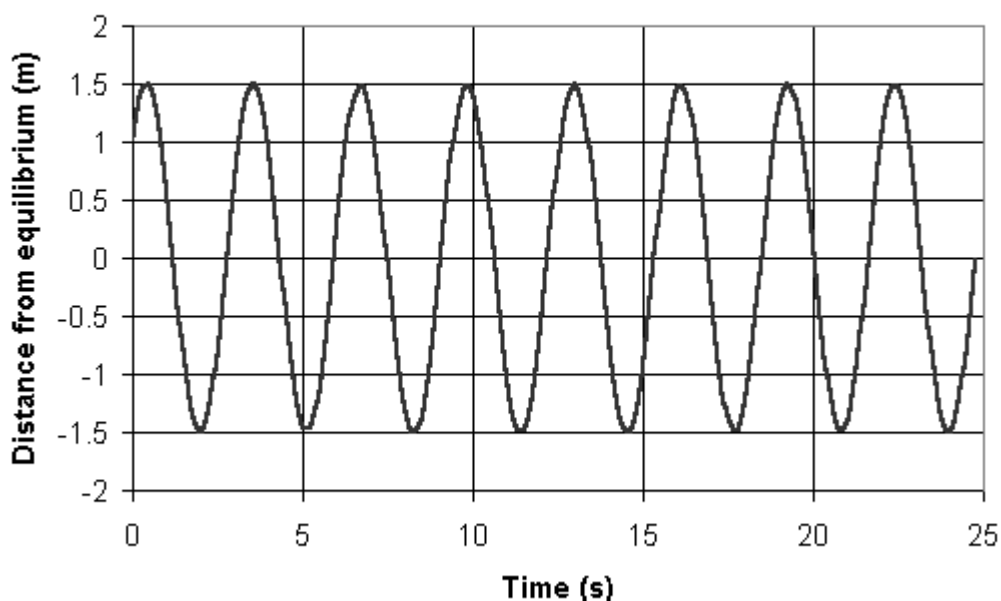
Question 6

An object is placed at one end of a spring, the other end being fixed. When the system is set into motion, the distance of the object from equilibrium varies with time as shown below.

- (a) What is the period of oscillation of the system?
- (b) What is its frequency?
- (c) What is the amplitude of oscillation?

You don't need to give uncertainties.

Motion of object on a spring



(3 marks)

Question 7

All materials have some inherent “elasticity” i.e. when subject to a force (or **stress**) they experience deformation (or **strain**), but recover their shape when the stress is removed, unless the stress is too great. The relationship between stress and strain for a brass wire can be studied by plotting the data given in the table below. The slope of this relationship, i.e. $\Delta\text{stress}/\Delta\text{strain}$, is called **Young's modulus**.

Stress (N m^{-2})	0.4×10^8	0.6×10^8	0.8×10^8	1.4×10^8	1.6×10^8	1.8×10^8
Strain (no units)	4.2×10^{-4}	6.3×10^{-4}	8.9×10^{-4}	1.4×10^{-3}	1.75×10^{-3}	2.1×10^{-3}

Graph the data.

For the brass wire, what is Young's modulus and its uncertainty?

(7 marks)