

## Trial test, Physics 1, UNSW

for introductory level subjects. Not for physics majors or higher physics

This test is a self-administered, self-marked trial.

- Reading time: 5 minutes  
Allowed time: 30 minutes  
Allowed material: pen, paper,  
calculator without alphanumeric keys, eg standard UNSW model.  
No books or written material.  
Data supplied:  $g = 9.8 \text{ ms}^{-2}$ .

### What is this test for?

The first formal feedback you will receive is from the midsession test, which is based on the first half of the semester. After allowing you time to revise the first seven weeks' work, and us time to mark the test, this feedback therefore comes in the second half of the semester. This test will give you earlier feedback. It will also give you some idea of how tests are marked.

### Warning: this test is not based on a typical sample of material.

This test is based on material covered briefly in your first three weeks of lectures. Most of this is revision of high school material, and relatively few new concepts are covered. It may therefore seem easier than one based on material from later sections with which you will be less familiar.

### How to mark this test.

Download the answers and marking scheme *after you have completed the test*.

Don't be over-generous in your marking. Near enough is not necessarily good enough. If your answer is a number when you have been asked for a quantity or if the answer is a vector and you have given a scalar, you will in general lose marks. You should also think about the appropriate number of significant figures in the answer, although this will not usually lose marks in tests of this sort.

Explanation is required. In the model answers, the text *is* required (except for the text in small italics, which is there by way of explanation of the answers).

If you get the first part of a question wrong, and if that answer is then used in further parts, you will not lose further marks for the subsequent parts, provided that your argument and working are correct.

**QUESTION 1**

**[Marks 10]**

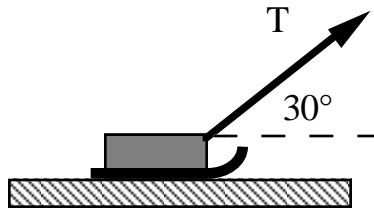
A stone is projected almost vertically upwards from the top of a building 78.4 m high with an initial velocity of  $29.4 \text{ ms}^{-1}$ . On its return flight it just misses the building and it reaches the ground near the base. Determine:

- (a) the time for the stone to reach the highest point of its path;
- (b) the maximum height reached in the path;
- (c) the total time of flight; and
- (d) the velocity of the stone just before it hits the ground.

**QUESTION 2**

**[Marks 10]**

A sled of mass 20 kg is being pulled across a horizontal surface by means of a rope, as shown in the diagram. The rope makes an angle of  $30^\circ$  with the horizontal, and the tension in the rope is  $T = 196 \text{ N}$ . The coefficient of sliding friction between the sled and the surface is 0.20.



- (a) Draw in all the forces acting on the sled in a diagram.
- (b) Calculate the normal force between the horizontal surface and the sled.
- (c) Calculate the force of friction on the sled.
- (d) Calculate the acceleration of the sled.