2 Use a long track of constant slope (fixed angle α) and mark off several different distances (say five — see Figure 1). Take three or four measurements for each distance and plot a graph of s versus t^2 as advised in the *Errata sheet* for p. 15 of Unit 4. Then find the average value of g using the *best fit* line through the graph and its uncertainty from the steepest and the shallowest line compatible with the data (see *Practical Handbook*, Section 5.3).

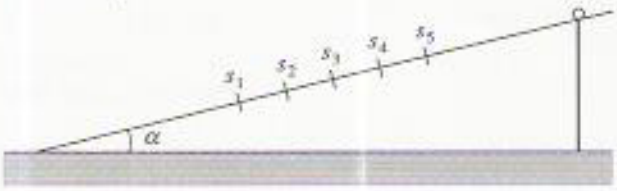

FIGURE 1

3 Use tracks of varying lengths (and varying slopes) for the same height difference h (see Figure 2). In this case, plot a graph of s^2 versus t^2 as advised in the *original text* on p. 15 of Unit 4.

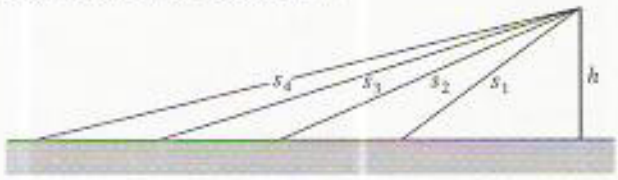

FIGURE 2

You may use any of these techniques, depending on your previous experience and on the circumstances in which you carry out the experiment.

Your report

Your report should have the following structure:

1 Introduction (no more than about 150 words) *(5 marks)*

This should specify:

(i) the aims of the experiment

(ii) the theoretical background (You should not repeat complete arguments from the Unit. It is sufficient to *quote* the most important equations that are going to be used.)

(iii) The measurements taken and the methods used to interpret the data (one or two sentences).

2 Experimental procedures (no more than about 400 words) *(14 marks)*

A description (supported by diagrams, where appropriate) of experimental techniques used in obtaining the data. It should be just sufficiently detailed to enable an informed reader to reproduce your measurements.

3 Results (not more than about 500 words) *(17 marks)*

(i) Raw data taken in your measurements, arranged in tables, where appropriate.

(ii) Graphical representation of data, where appropriate.

(iii) Calculations of required quantities from the data, using numerical and/or graphical methods.

Remember to include realistic estimates of initial experimental uncertainties and the resulting uncertainties in calculated quantities. All quantities must be quoted with their SI units and to an appropriate number of significant figures.

4 Conclusions (100–200 words) *(4 marks)*

This final part should include a statement on whether the experimental results agree with theoretical predictions, or not — within given uncertainties. It should also indicate how such uncertainties could be reduced to obtain a more convincing test, or what alternative experiments can be carried out.