

Section A

Answer **all** the questions in this section in the spaces provided.

1. A sphere is projected horizontally. The sphere is photographed onto the same film negative at intervals of 0.100 s with an uncertainty of ± 0.001 s. The 7 images of the sphere are shown against a grid in Fig. 1.1. The actual uncertainty for the distances measured is 0.1 cm. Air resistance is negligible.

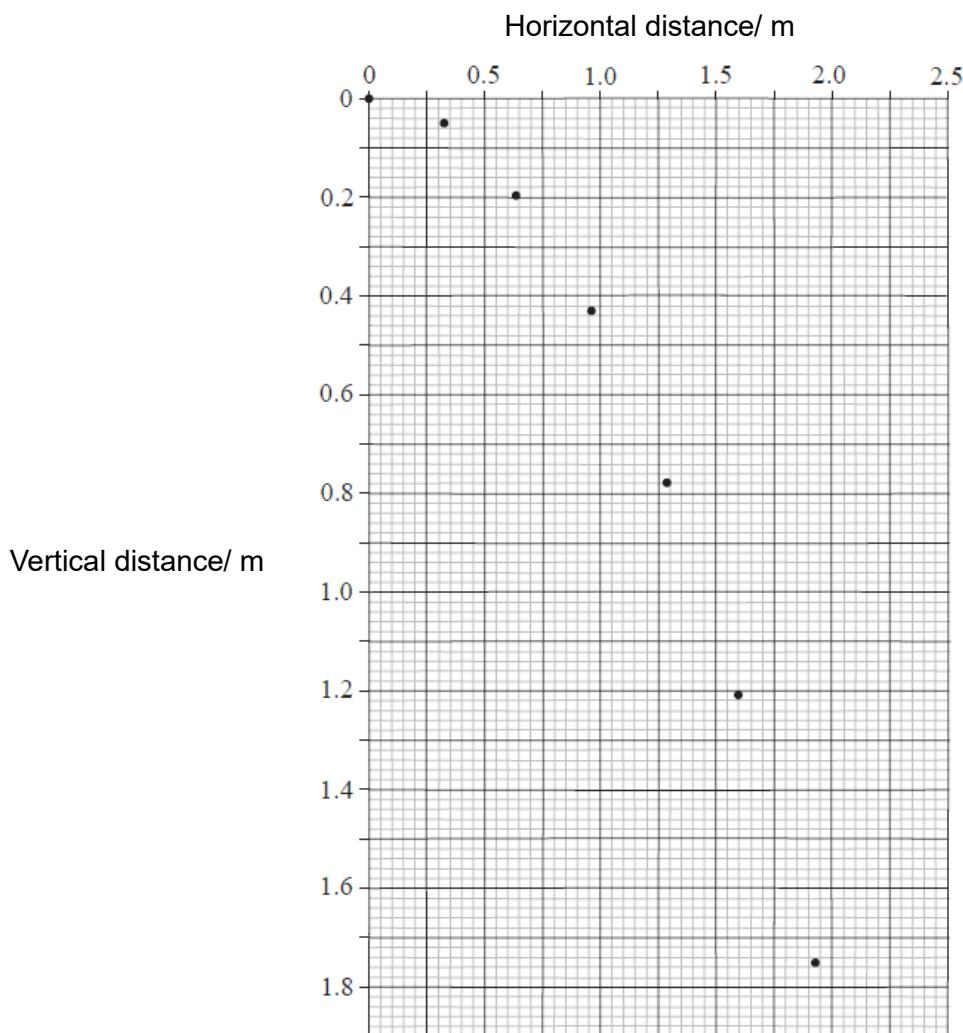


Fig. 1.1

- (a) Use Fig. 1.1 to determine the acceleration g of the sphere.

[2]

$$g = \dots \text{m s}^{-2}$$

- (b) Explain how your choice of the data point from Fig 1.1 helps to improve the reliability of your calculation in (a). [1]

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- (c) Use your answer in (a) to determine the actual uncertainty in the value of g . Hence give a statement of g , with its uncertainty, to an appropriate number of significant figures. [4]

$$g = \dots \pm \dots$$

- (d) Using existing data, explain how you can improve the accuracy of g obtained by plotting a different graph. Explain why this new method is more accurate. [2]

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