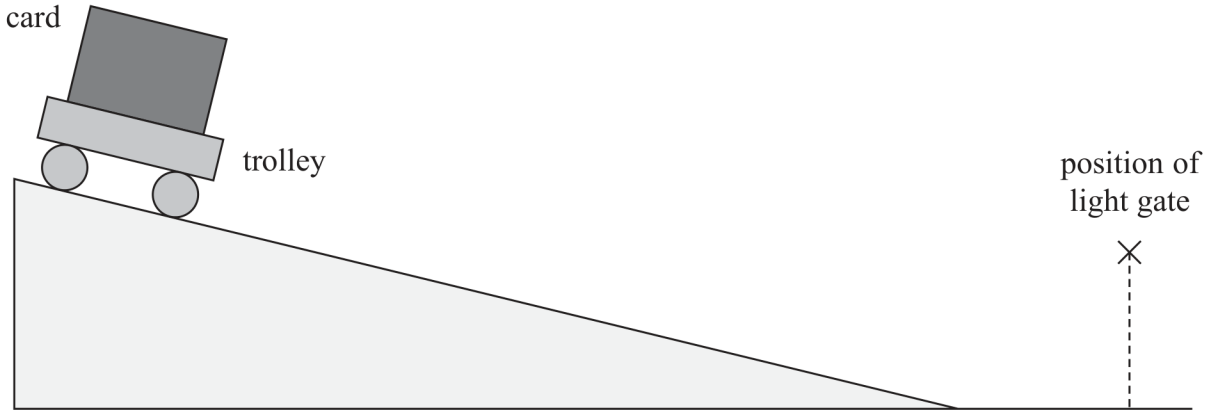
Answer ALL questions.

1 A student investigated the acceleration of a trolley as it rolled down a ramp. The trolley was released from rest at the top of the ramp and allowed to roll onto a horizontal surface. There was a single light gate above the horizontal surface, as shown.



(a) The light gate was connected to a data logger. The data logger recorded the time taken for the card to pass through the light gate.

Describe how the student could determine the velocity v of the trolley as it passed through the light gate.

(2)

.....

.....

.....

.....

(b) The student repeated the procedure and determined four values of v. The values are shown in the table.

v / m s^{-1}			
2.07	1.84	1.91	2.10

(i) Calculate the mean value for v and the percentage uncertainty in v.

(3)

Mean v = ... m s^{-1}

Percentage uncertainty in v = ... %

(ii) The student measured the distance s that the trolley travelled on the ramp.

Determine the acceleration of the trolley on the ramp.

s = 1.50 m

(2)

Acceleration = ... m s^{-2}

(iii) A second student carried out the same experiment and determined a similar value for the acceleration of the trolley on the ramp.

State why this does **not** show that the results are reproducible.

(1)

(Total for Question 1 = 8 marks)