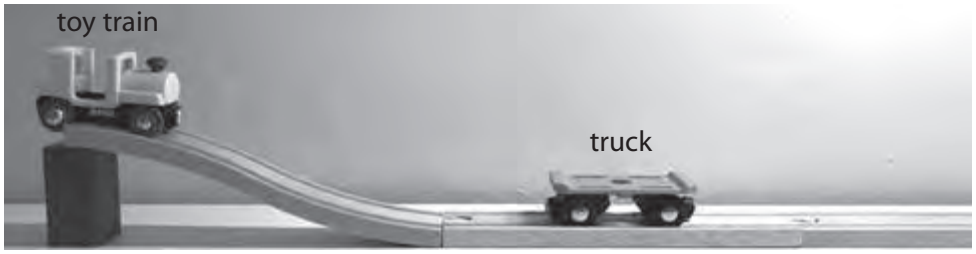
9 A student investigates the motion of a toy train.

The toy train is released from rest and rolls down the slope.



(a) The toy train has a mass of 0.039 kg.

The toy train moves with a velocity of 0.56 m/s when it reaches the bottom of the slope.

(i) State the equation linking momentum, mass and velocity.

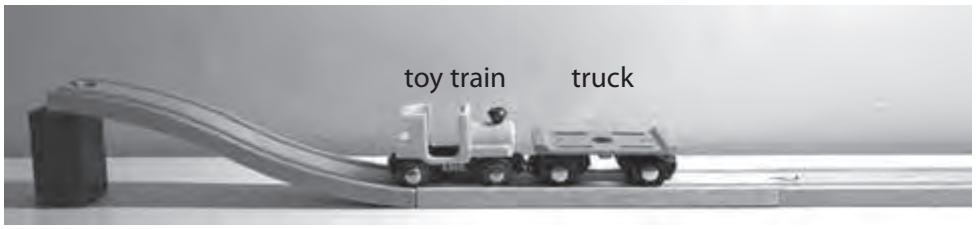
(1)

(ii) Calculate the momentum of the toy train when it reaches the bottom of the slope.

(1)

momentum = ... kg m/s

(iii) The toy train hits the truck and they stick together.



The train and truck move away together with a velocity of 0.26 m/s.

Calculate the mass of the truck.

(3)

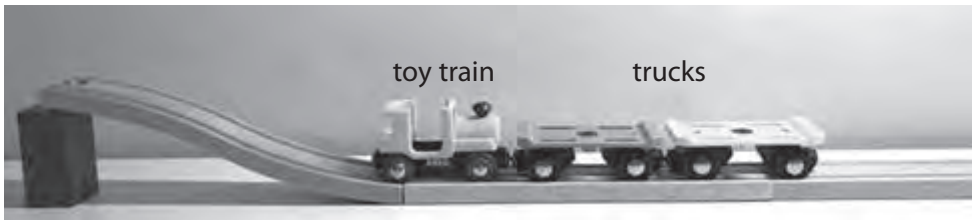
mass = ... kg

QUESTION 9 CONTINUES ON PAGE 20

(b) The student repeats the investigation using another identical truck connected to the first truck.

The student releases the toy train from the top of the slope in the same way as before.

The toy train hits the trucks and they stick together.



The toy train and trucks move away together.

The student concludes

"The two trucks are identical, so their velocity will be the same as when there was just one truck."

Discuss whether the student's conclusion is correct or not.

(3)

(Total for Question 9 = 8 marks)

TOTAL FOR PAPER = 60 MARKS