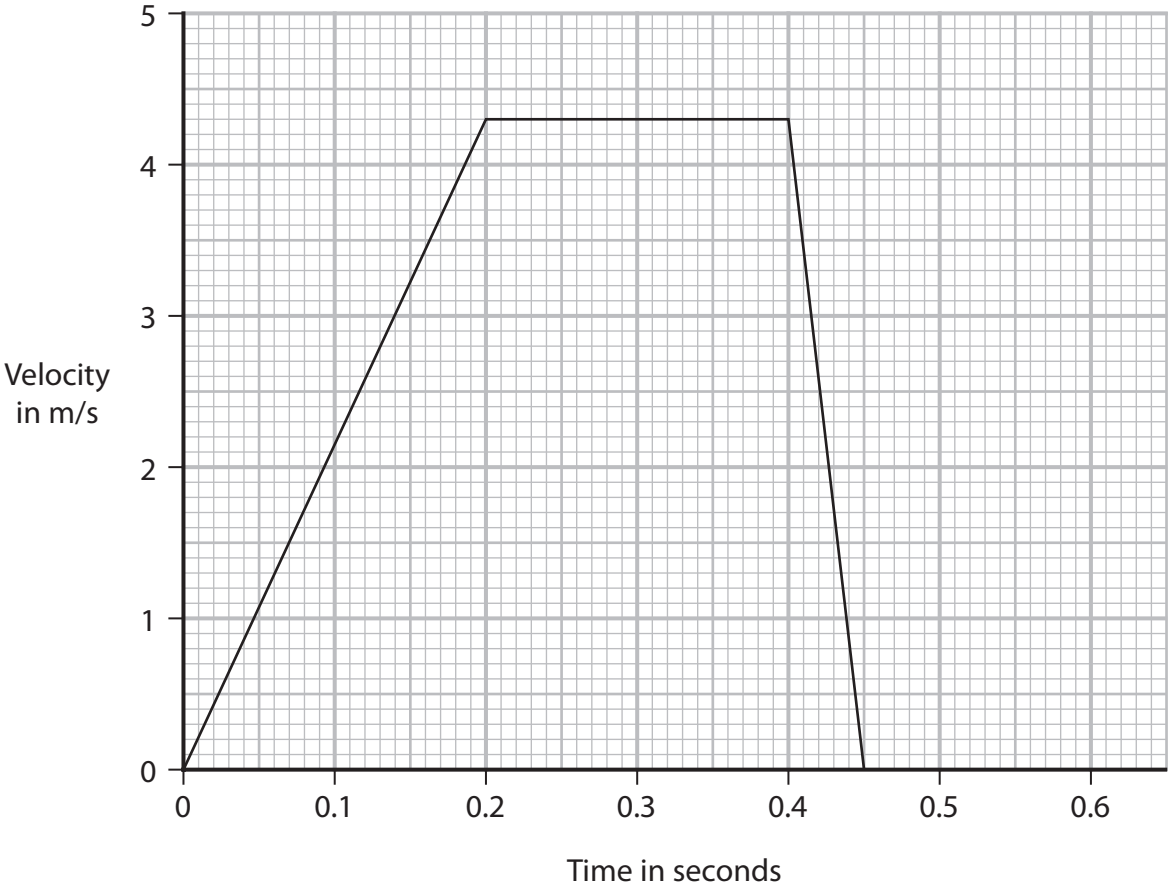
5 A student does an investigation to show how the velocity of a toy car changes when the car rolls down a ramp onto a table and hits a wooden block.

The graph shows how the velocity of the toy car changes with time.



(a) Calculate the distance travelled by the car during the first 0.4 seconds.

(4)

distance = ... m

(b) (i) Calculate the acceleration of the car between 0.40 s and 0.45 s.

(3)

acceleration = ... m/s^2

(ii) State the formula linking resultant force, mass and acceleration.

(1)

(iii) The car has a mass of 0.13 kg.

Calculate the resultant force on the car as it slows down.

(2)

resultant force = ... N

(c) A piece of soft material is fixed to the front of the toy car.

Explain how this will affect the gradient of the velocity-time graph after the car hits the block.

(3)

.....

.....

.....

.....

.....

.....

(Total for Question 5 = 13 marks)

BLANK PAGE