

Name of the Student: _____

Max. Marks : 18 Marks

Time : 18 Minutes

Q1.

A student has some cupcake cases.

One cupcake case is shown in Figure 2.



(Source: © Anton Starikov/Shutterstock)

Figure 2

The student drops a stack of cupcake cases with the base facing downwards, as shown in Figure 3.



(Source: © Elena Schweitzer/Shutterstock)

Figure 3

The speed of the falling stack of cupcake cases depends on the number of cupcake cases in the stack.

(i) The student also has a stop clock and a metre rule.

Describe an investigation to show how the speed of the falling stack of cupcake cases depends on the number of cupcake cases in the stack.

(4)

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(ii) A stack of cupcake cases has a mass of 0.005 kg.

Calculate the weight, in newtons, of the stack of cupcake cases.

Gravitational field strength = 10 N / kg

(2)

Use the equation

$$W = mg$$

weight = N

Figure 4 shows a cupcake case that is falling at a constant velocity.

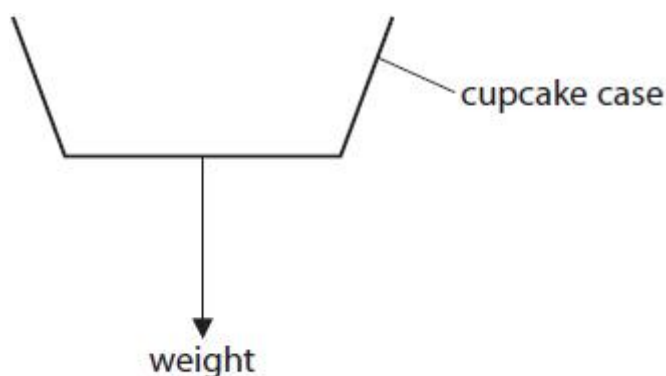


Figure 4

(iii) Draw an arrow on Figure 4 to show the force due to air resistance on the cupcake case.

(1)

(iv) State the value of the acceleration of the cupcake case when it is falling at a constant velocity.

(1)

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(Total for question = 8 marks)

Q2.

Figure 12 shows a different velocity/time graph.

This straight line graph can be represented by the equation

$$y = mx + c$$

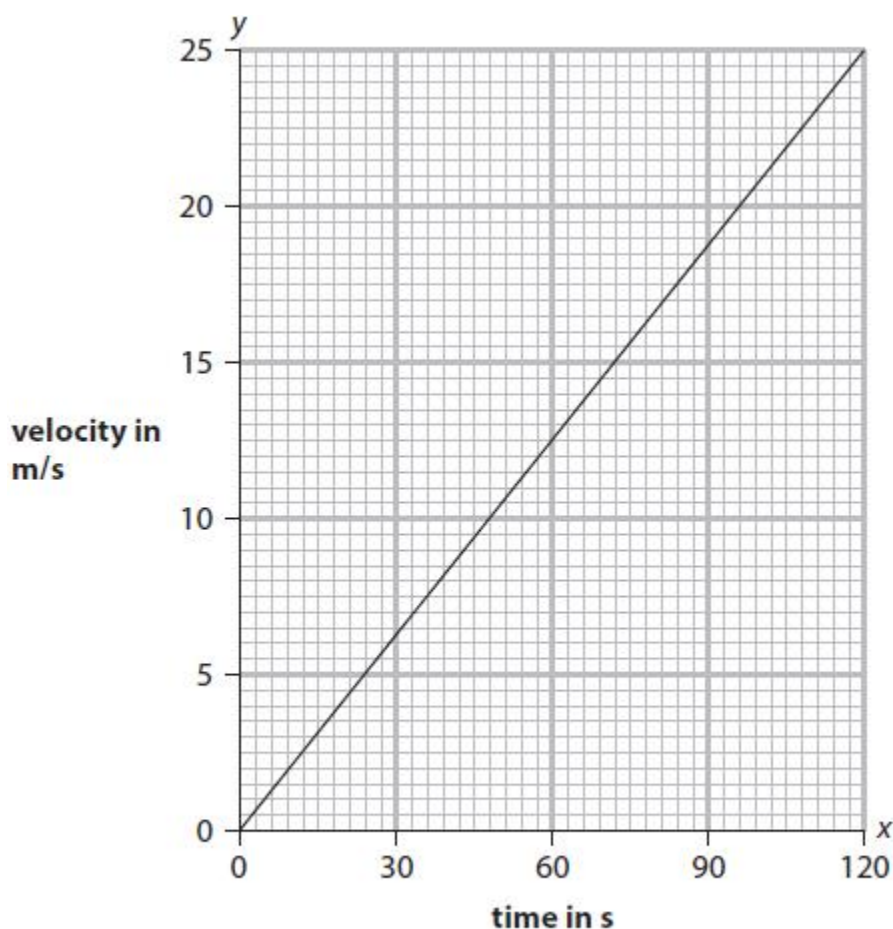


Figure 12

(i) Give the quantities that x and y represent in the equation.

(1)

x represents

y represents

(ii) Calculate the value of m from the graph in Figure 12.

(2)

$m = \dots\dots\dots \text{m/s}^2$

(iii) State the value of c from the graph in Figure 12.

(1)

value of $c = \dots\dots\dots$

(Total for question = 4 marks)

Q3.

Figure 13 shows two ice skaters during a performance.



Figure 13

- (i) The two ice skaters are travelling together in a straight line at 3.50 m/s.

Their total momentum is 371 kgm/s.

The man has a mass of 64.5 kg.

Calculate the mass of the woman.

(4)

mass = kg

- (ii) Calculate the kinetic energy of the man.

(2)

kinetic energy = J

(Total for question = 6 marks)