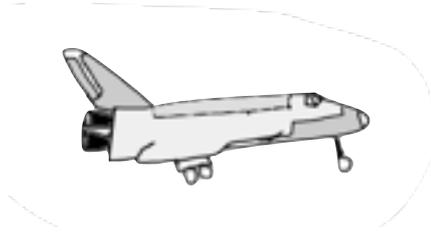


1 The diagram shows a space orbiter about to touch down on a runway. There is also data about its motion.



Important to look at the data and any other information **before** you attempt the question.

Velocity at touch down	= 110 m/s
Time to stop from moment of touch down	= 55 s

1 (a) Using the information given and the correct equation from the equation sheet, calculate the average acceleration of the orbiter from the moment of touch down.

**Give the correct units.**

The fact that they ask you to calculate the **average** acceleration might be confusing, but they have to say 'average' unless they state what happens between 0 & 55 sec. The orbiter is slowing down so the acceleration is negative.

Show your working.

An answer of -2 gets 2 marks, even without working shown.

$\frac{0 - 110}{55}$  [1 mark]

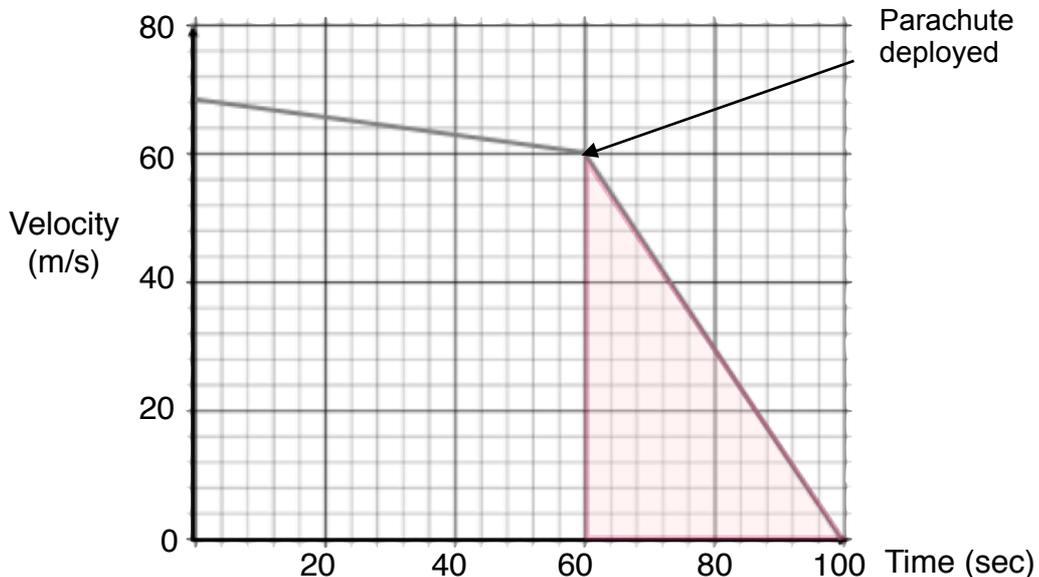
-2 [1 mark] If answer give is 2, maximum marks is 2

m/s/s or m/s<sup>2</sup> or ms<sup>-2</sup> [1 mark]

Acceleration = .....-2 m/s<sup>2</sup> .....

(3 marks)

1 (b) The graph below is a velocity-time graph for the motion of the orbiter from a previous landing. A parachute is used to slow the orbiter on the runway. The graph shows the velocity of the orbiter before and after the parachute is deployed.



- 1 (b) Use the graph to calculate the gradient and therefore the deceleration of the orbiter from the point at which the parachute is deployed.

Give the correct units.

Show your working.

Evidence of use of graph, e.g. the correct triangle drawn, or correct points used [1 mark]

-60/40 or 0-60/40 [1 mark]

-1.5 [1 mark]

m/s/s or m/s<sup>2</sup> or ms<sup>-2</sup> [1 mark]

Just writing the correct answer with units = 2 marks

Just the correct answer with no units = 1 mark

The answer would be a negative number as negative acceleration is deceleration. In a question like this, you must use the graph as the question asks you to.

Acceleration = .....- 1.5 m/s<sup>2</sup>.....  
(3 marks)

- 2 A car accelerates from rest, to a velocity of 25 m/s in 10 seconds. Calculate the acceleration of the car. Use the correct equation, from the equation sheet.

Show your working.

$\frac{25 - 0}{10}$  or 25/10 [1 mark]

2.5 [1 mark]

Mark schemes will often give full marks for just the correct answer, but this is not advisable, because if you get the answer wrong, you lose the working marks. Easily done under exam pressure.

writing 2.5 with no working gets full marks.

Acceleration = ..... m/s/s  
(2 marks)

**Total 8 marks**

**End of questions**