

- 1 There are 30 passengers in the upper compartment of a bus and 2 passengers in the bottom compartment of the bus.

State how this affects the stability of the bus and the reason for this.

.....

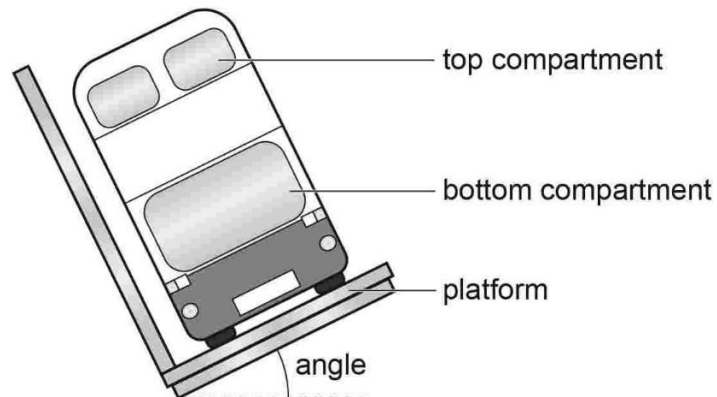
.....

..... [2]

[Total: 2]

- 2 In a double-decker bus there are two passenger compartments, one above the other.

The diagram shows a double-decker bus on a tilted platform.



The platform is used to test the stability of the bus.

The angle the bus makes with the horizontal is gradually increased until the bus begins to topple to the left.

Explain why the bus begins to topple.

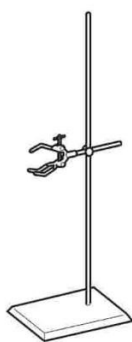
.....

.....

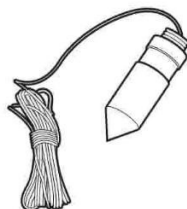
..... [1]

[Total: 1]

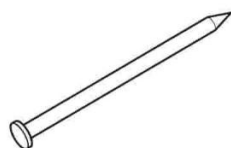
- 3 A student finds the centre of mass of a shape made of thin card. The diagram shows the equipment.



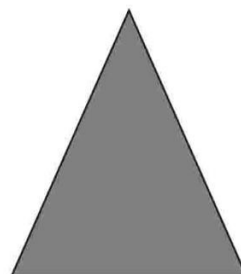
clamp stand and clamp



plumbline



nail or pin



shape made  
of thin card

(NOT to scale)

Describe how the student finds the centre of mass of the card. Choose from these sentences.

- A A line is drawn on the card showing the position of the string.
- B A pin held in a clamp is put through the hole in the card.
- C The centre of mass is where the lines cross on the card.
- D The process is repeated using holes near the other two edges.

Complete the flow chart. Write the letter for the correct sentence in each box.

A small hole is made near one edge of the card



The plumbline is attached to the pin



[Total: 3]

- 4 A cone is placed on a table in two positions, as shown in the diagram.



Explain why the flat-top cone is less stable when it is inverted.

.....

.....

.....

.....

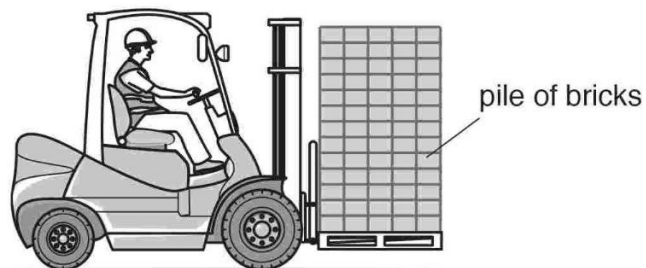
.....

[3]

[Total: 3]

- 5 Diagram A shows a truck lifting a pile of identical bricks.

diagram A



- (a) On diagram A, draw a cross to indicate the centre of mass of the pile of bricks.

[1]

- (b) The truck can tilt the pile of bricks backwards, as shown in diagram B.

diagram B



Explain how tilting the pile of bricks backwards makes the truck more stable.

.....

.....

.....

.....

[1]

[Total: 2]