Turning Effect – 2019 Nov IGCSE

1. 0625/31/O/N/19/No.4

Fig. 4.1 shows a tractor fitted with a device for breaking up soil in a field.

Fig. 4.1

(a) (i) The tractor has a heavy weight at the front. Explain why the heavy weight is needed.

.....

..... [1]

(ii) Fig. 4.2 represents the weight of the device and its distance from the pivot.

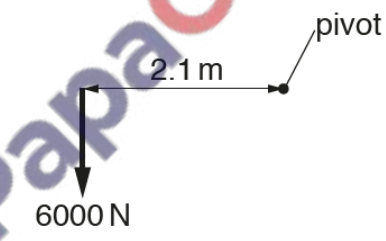


Fig. 4.2

Calculate the moment of the weight of the device about the pivot. State the unit.

moment = ... [4]

(b) Fig. 4.3 shows a tractor fitted with narrow tyres and the same tractor fitted with wide tyres.

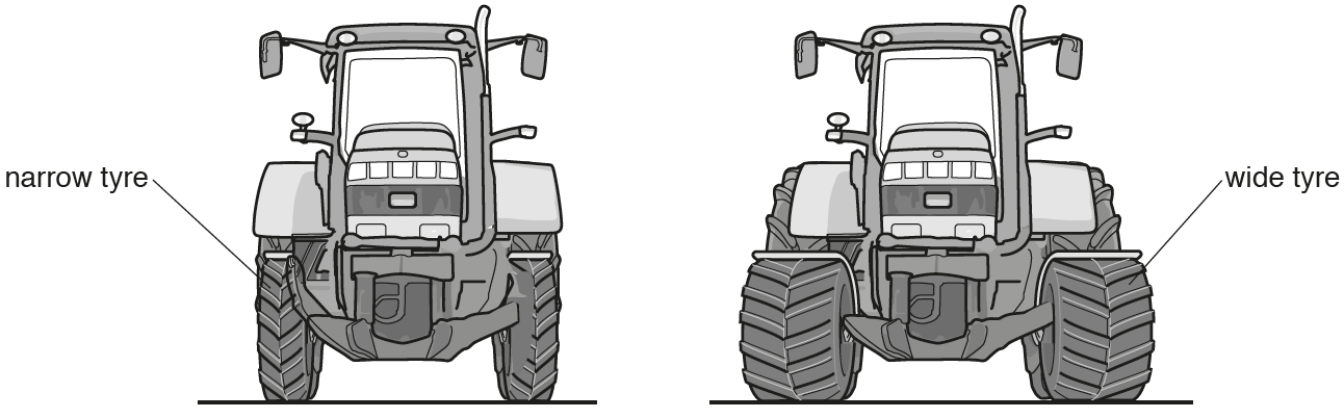


Fig. 4.3 (view from the front)

Explain why wide tyres are more suitable for the tractor on soft soil.

.....

.....

.....

..... [3]

[Total: 8]

2. 0625/32/O/N/19/No.4

(a) Fig. 4.1 shows a metal triangle suspended from a thread.

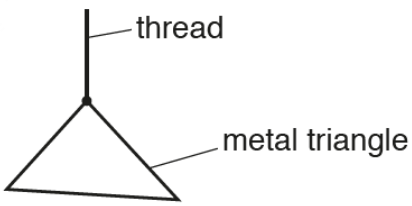


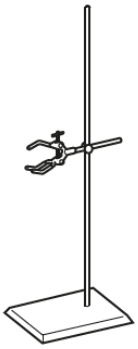
Fig. 4.1

Complete the sentence. Choose the correct word or phrase from the box.

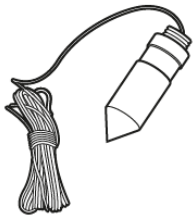
above	below	to the left of	to the right of

The metal triangle will come to rest with its centre of mass directly ..... the point of suspension. [1]

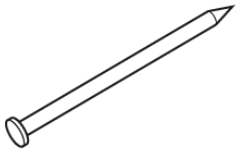
(b) A student finds the centre of mass of a shape made of thin card. Fig. 4.2 shows the equipment.



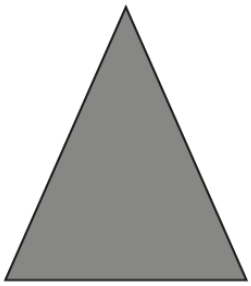
clamp stand and clamp



plumbline



nail or pin



shape made of thin card

Fig. 4.2 (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

↓

☐

↓

☐

↓

☐

[3]

[Total: 4]

3. 0625/42/O/N/19/No.2

(a) State the **two** conditions which must be true for an object to be in equilibrium.

condition 1 .....

condition 2 .....

[2]

(b) Fig. 2.1 shows a uniform metre rule PQ in equilibrium.

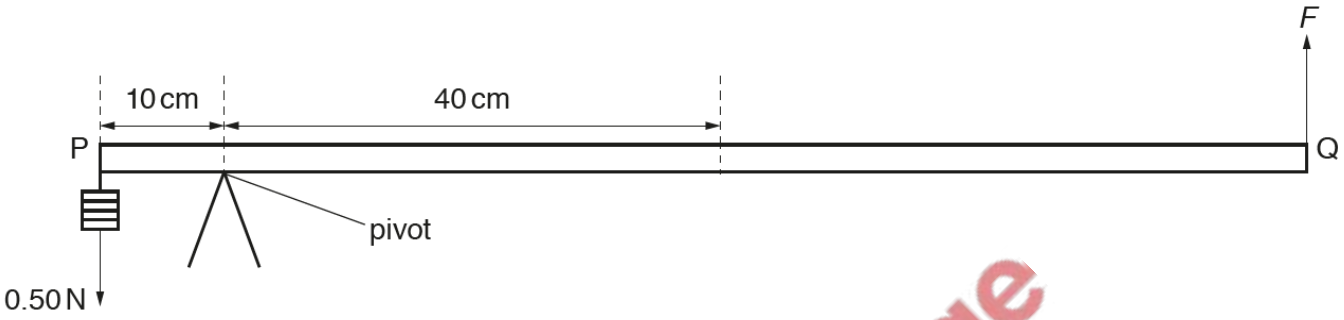


Fig. 2.1

The distance PQ is 100 cm. The mass of the metre rule is 0.12 kg and its weight is *W*.

(i) On Fig 2.1, draw and label:

1. an arrow to show the force *W* acting on PQ at the centre of mass

2. an arrow to show the force *R* acting on PQ at the pivot.

[2]

(ii) By taking moments about the pivot, calculate *F*.

F = ... [4]

(iii) Calculate *R*.

R = ... [2]

[Total: 10]

(a) (i) State, in words, the equation that defines the *moment of a force*.

.....

..... [2]

(ii) State what is meant by the *moment of a force*.

..... [1]

(iii) *Force* is a vector quantity.

Explain what is meant by the term *vector*.

.....

..... [1]

(b) Fig. 2.1 shows a tower crane used to lift a load on a construction site.

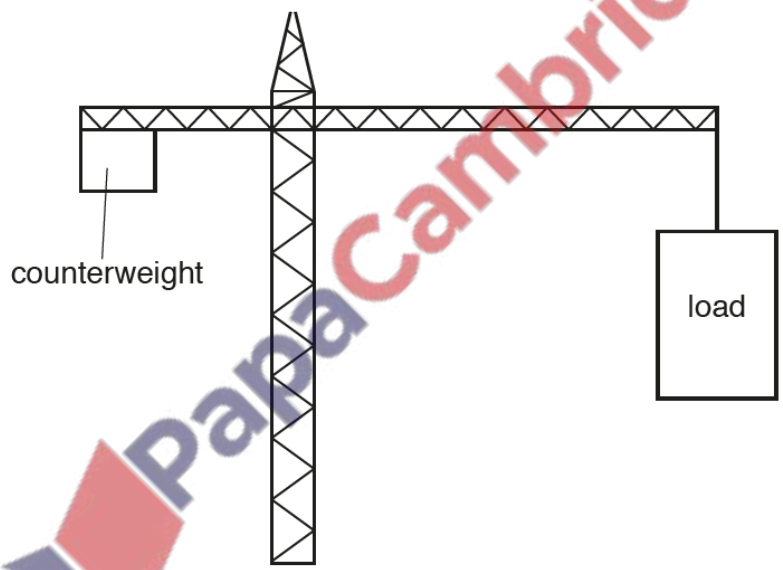


Fig. 2.1

Explain how the counterweight prevents the crane from toppling over.

.....

.....

..... [2]

[Total: 6]