Moments

Question Paper

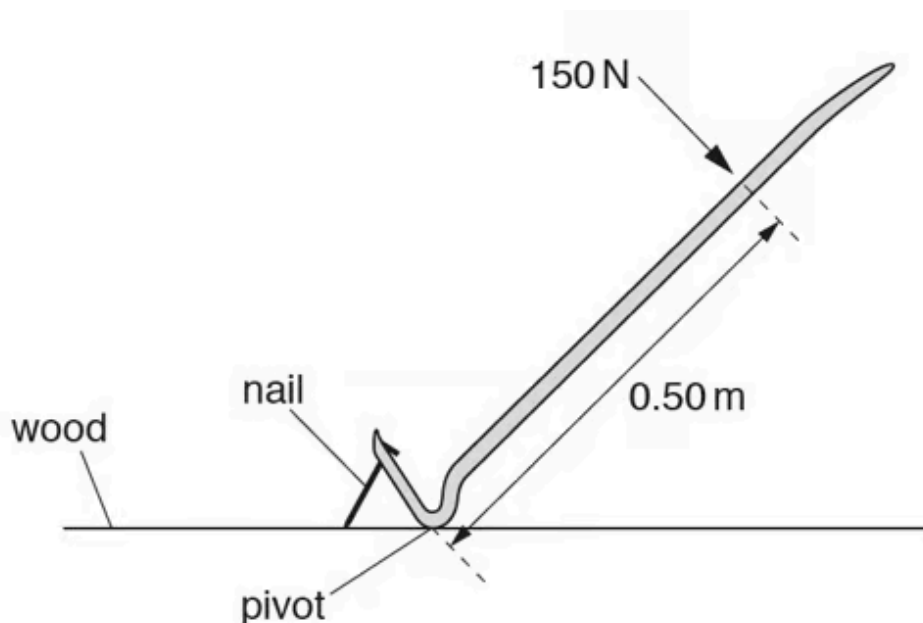| Course	CIE IGCSE Physics
Section	1. Motion, Forces & Energy
Topic	Moments
Difficulty	Easy

Time Allowed   40

Score   /29

Percentage   /100

Question 1a

A man uses a metal bar to remove an iron nail from a piece of wood, as shown in Fig. 3.1.

Fig. 3.1

(i) The man applies a force of 150 N at a distance of 0.50 m from the pivot.
Calculate the moment of this force about the pivot. Include a unit.

moment = ... [4]

(ii) The force applied by the man produces a turning effect (moment) about the pivot.
Describe another example of using the turning effect of a force.

[1]
[5 marks]

Question 1b

The man tries to use the metal bar to remove another nail from the piece of wood. He applies the same force of 150 N at a distance of 0.50 m from the pivot.
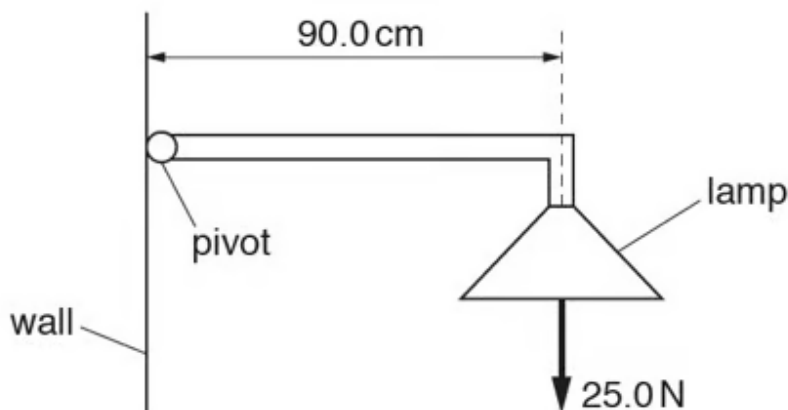
The turning effect produced is not enough to remove this nail from the piece of wood.

Describe how the man can increase the turning effect without increasing the force.

[1 mark]

Question 2

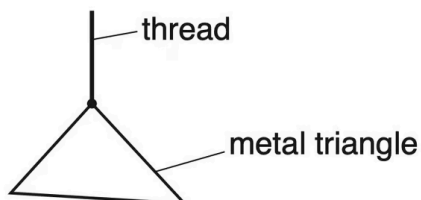A lamp is attached to a wall, as shown in Fig. 4.1.

Fig. 4.1

Calculate the moment of the lamp about the pivot. Give the unit.

moment = ...

[4 marks]

Question 3a

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 gravity directly .... the point of suspension.

[1 mark]

Question 3b

A student finds the centre of gravity 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
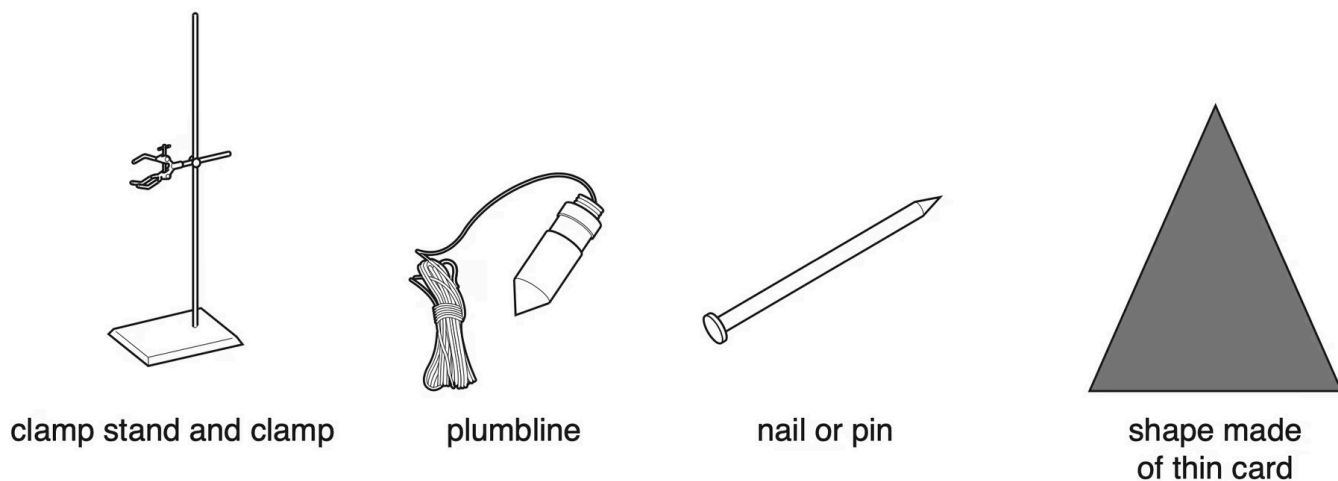
Fig. 4.2 (NOT to scale)

Describe how the student finds the centre of gravity 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 gravity 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.

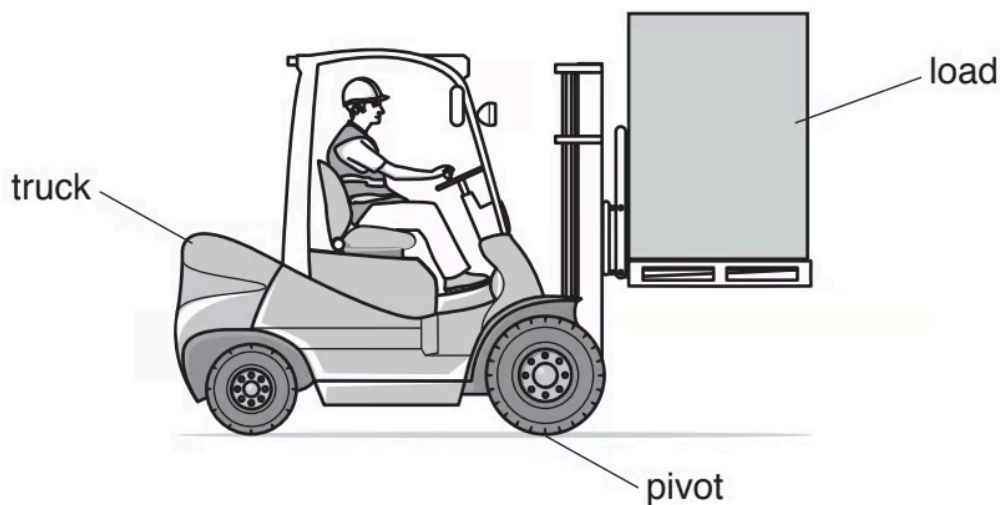A small hole is made near one edge of the card

↓

☐

↓

The plumbline is attached to the pin

↓

☐

↓

☐

↓

☐

[3 marks]

Question 4a

Fig. 4.1 shows a truck lifting a heavy load.

Fig. 4.1

(i)   The truck is stationary. Identify the quantities that determine the work done as it lifts the load.

Tick the box next to each correct quantity.

☐ distance
☐ force
☐ time

[1]

(ii)   Draw a ring around the unit for work done from the list.

joule   newton   pascal   watt

[1]

[2 marks]

Question 4b

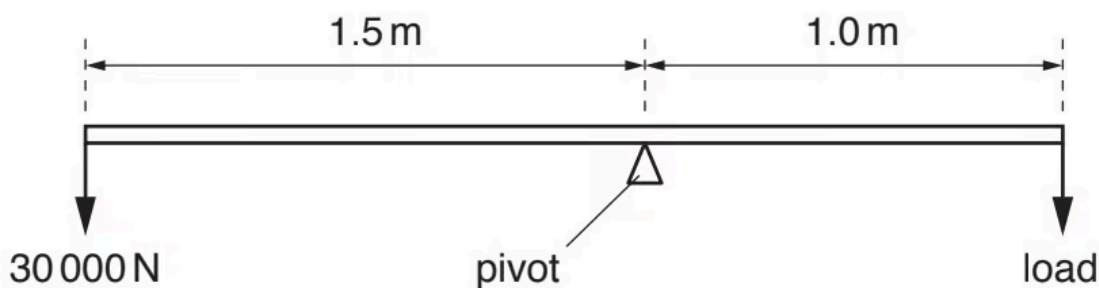Identify the quantities that determine the power of the truck.

Tick the box next to each correct quantity.

☐ energy transferred
☐ temperature
☐ time

[1 mark]

Question 4c

The truck has a pivot near the front wheel. Fig. 4.2 represents the pivot and the vertical forces acting on the truck.
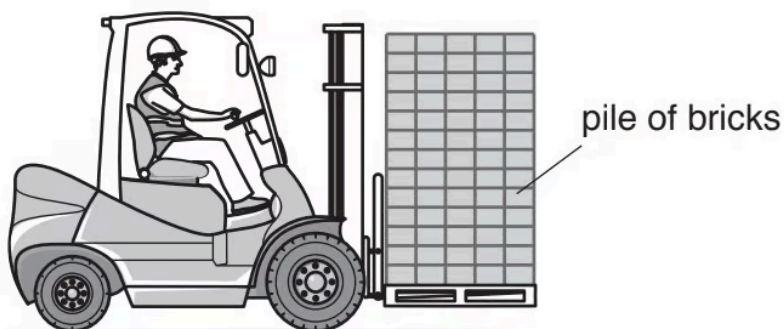

Fig. 4.2

The truck is in equilibrium.

Calculate the load.

load = ... N

[3 marks]

Question 4d

Fig. 4.3 shows another truck lifting a pile of identical bricks.

Fig. 4.3

(i) On Fig. 4.3, draw a cross to indicate the centre of gravity of the pile of bricks.

[1]

(ii) The truck can tilt the pile of bricks backwards, as shown in Fig. 4.4.

Fig. 4.4

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

[1]

[2 marks]

Question 5a

Define the term *moment*.

[1 mark]

Question 5b

A uniform seesaw is in equilibrium with a box placed on each side.

The box on the left has an anticlockwise moment of 150 N m about the pivot.
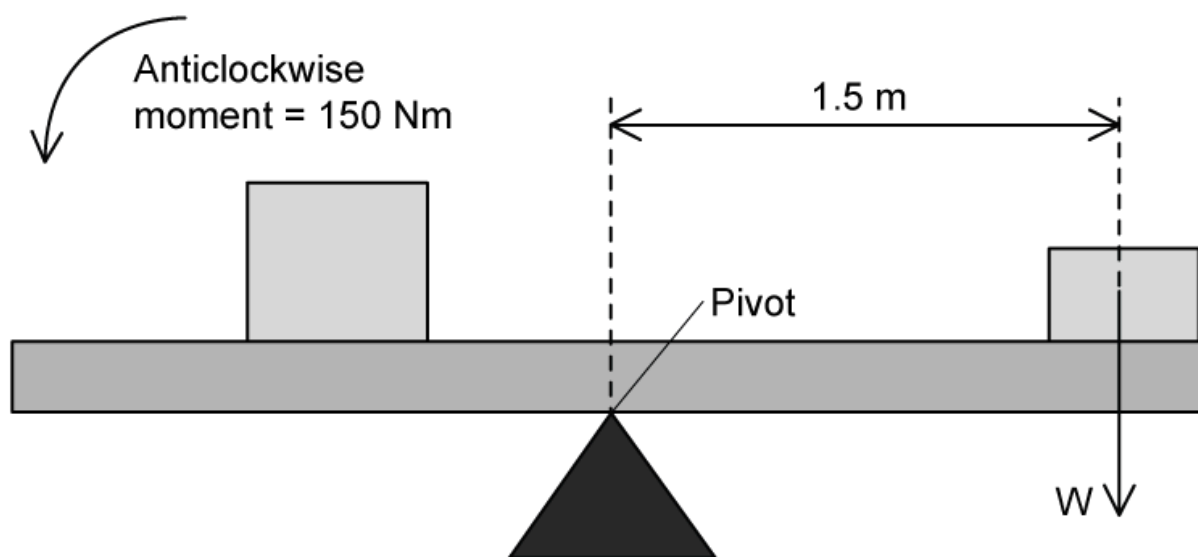
The box on the right has weight *W*.

Fig. 1.1

State the clockwise moment due to the box on the right.

[1 mark]

Question 5c

Calculate the weight W of the box on the right side of the seesaw.

[3 marks]

Question 5d

The box on the left hand side of the seesaw is now removed. Explain the subsequent motion of the seesaw.

[2 marks]