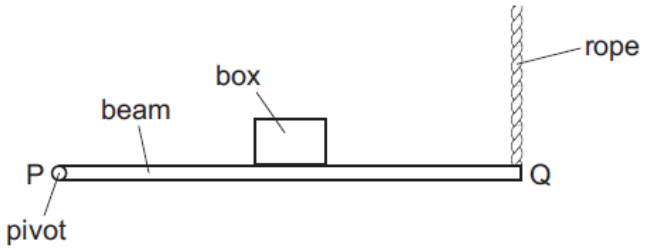
Turning Effect of Force – 2023 IGCSE Physics 0625

1. Nov/2023/Paper_ 0625/11/No.7

The diagram shows a wooden beam PQ which is attached to a wall by a pivot at P and kept in a horizontal position by a vertical rope attached at Q.

A box has been placed on the beam.



Which changes **must** reduce the tension in the rope at Q?

A Decrease the mass of the box and move it towards P.

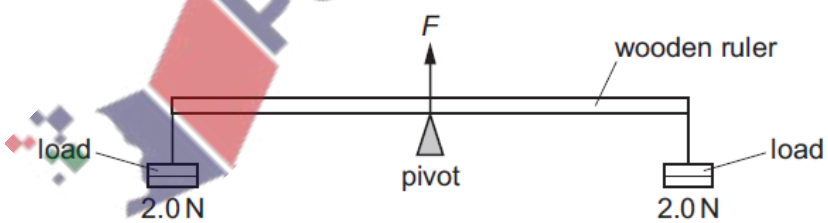
B Decrease the mass of the box and move it towards Q.

C Increase the mass of the box and move it towards P.

D Increase the mass of the box and move it towards Q.

2. Nov/2023/Paper_ 0625/12/No.7

A uniform wooden ruler is pivoted at its centre. A load of 2.0 N is suspended from each end of the ruler.



The pivot exerts an upward force *F* on the ruler.

What is *F* equal to?

A 2.0 N

B the weight of the ruler

C 4.0 N

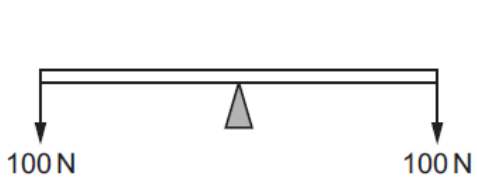
D 4.0 N plus the weight of the ruler

3. Nov/2023/Paper_ 0625/13/No.6

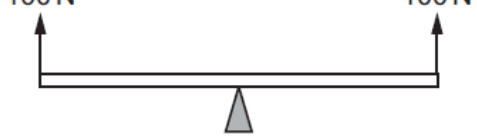
A uniform rod rests on a pivot at its centre. The rod is not attached to the pivot. Forces are then applied to the rod in four different ways, as shown. The weight of the rod can be ignored.

Which diagram shows the rod in equilibrium?

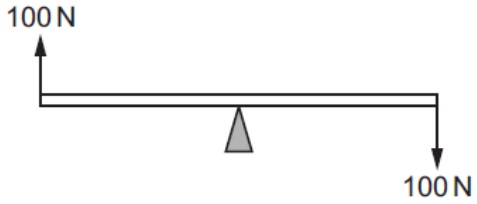
A



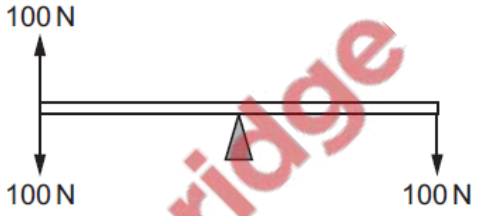
B



C

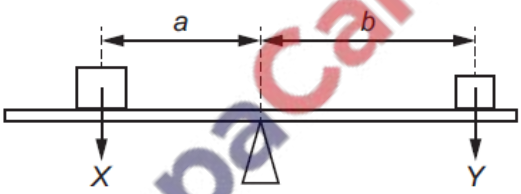


D



4. Nov/2023/Paper_ 0625/13/No.7

The diagram shows a beam balanced on a pivot. Two forces, *X* and *Y*, are acting on the beam.



Which calculation gives the moment of the force *Y* about the pivot?

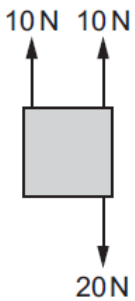
A $Y \times (a + b)$ **B** $\frac{Y}{(a+b)}$ **C** $Y \times b$ **D** $\frac{Y}{b}$

5. Nov/2023/Paper_ 0625/22/No.6

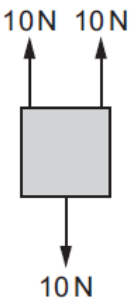
The diagrams show four identical objects. Each object is acted on by only the forces shown.

Which diagram shows an object in equilibrium?

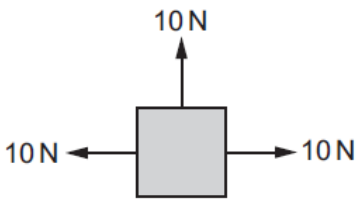
A



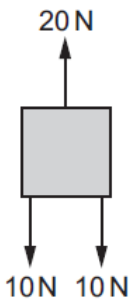
B



C



D



6. Nov/2023/Paper_ 0625/31/No.2(c)

(c) The student balances a beam on a pivot. On the beam, he positions the cylinder and a block so that the beam remains balanced. The arrangement is shown in Fig. 2.2.

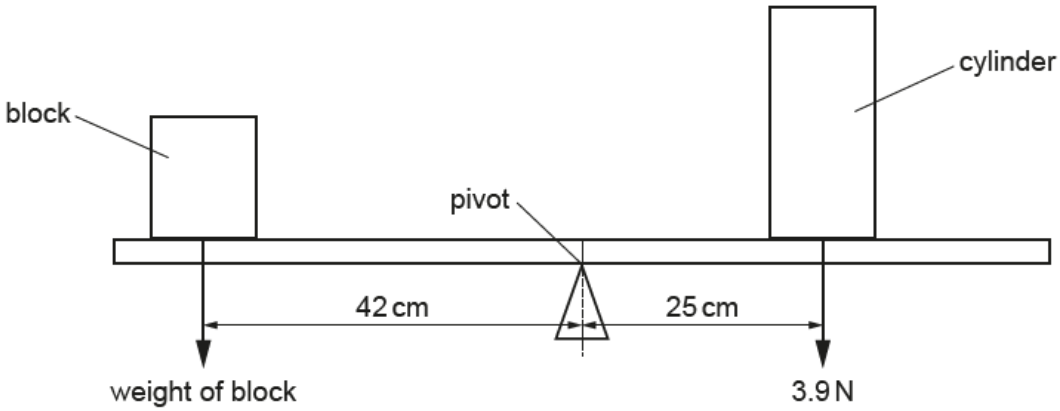


Fig. 2.2 (not to scale)

Calculate the weight of the block.

weight of block = ... N [4]

7. Nov/2023/Paper_ 0625/32/No.3(a_ bi)

A platform rests on a pivot as shown in Fig. 3.1.

A diver sits at a distance of 1.8 m from the pivot. The weight of the diver is 1100 N.

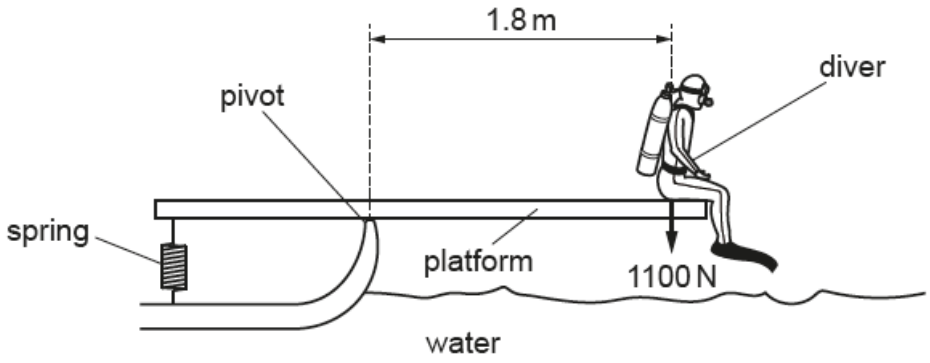


Fig. 3.1 (not to scale)

(a) Using the information in Fig. 3.1, calculate the moment of the diver about the pivot.

moment of diver = ... N m [3]

(b) **(i)** Fig. 3.2 represents the platform without the diver.

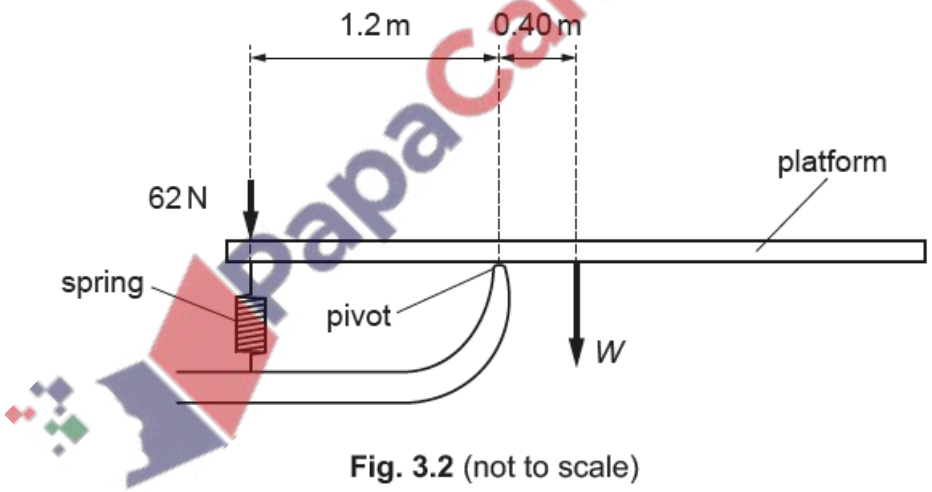


Fig. 3.2 (not to scale)

The moment of the weight *W* of the platform is balanced by the moment of the spring. The spring exerts a downward force of 62 N.

Using the information in Fig. 3.2, calculate the weight *W* of the platform.

W = ... N [3]

8. Nov/2023/Paper_ 0625/41/No.4(a, b)

A radio transmitter is a very tall, thin cylinder. It is prevented from falling over by wires which have one end fixed to the transmitter and the other end fixed in the ground. The ends of the wires in the ground are a long distance from the transmitter.

Fig. 4.1 shows the transmitter and two of the wires.

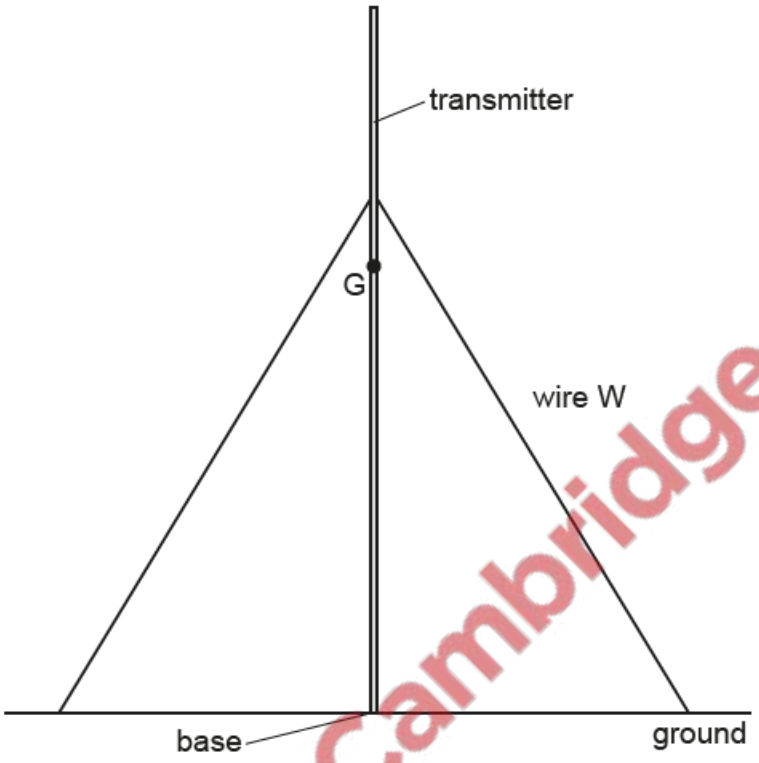


Fig. 4.1

(a) The centre of gravity G is shown on Fig. 4.1.

(i) State what is meant by centre of gravity.

.....

..... [1]

(ii) Explain why the radio transmitter without the wires is a very unstable structure.

.....

..... [1]

(b) Wire W is under tension and it exerts a force *T* on the transmitter.

(i) On Fig. 4.1, mark an arrow to show the force *T* exerted by wire W on the transmitter. [1]

(ii) The force *T* produces a moment on the transmitter about its base.

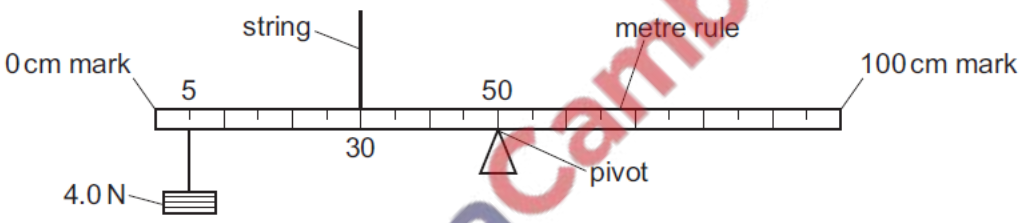
Describe how the moment produced by *T* is calculated and indicate on Fig. 4.1 what is meant by any other terms in the description.

.....

..... [3]

9. June/2023/Paper_0625/11/No.8

The diagram shows a uniform metre rule. The rule is pivoted at its mid-point. A weight of 4.0 N is suspended from the rule at the 5 cm mark. The rule is held by a string at the 30 cm mark. The rule is in equilibrium.

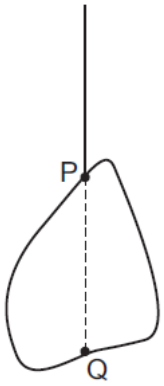


What is the upward force that the string exerts on the rule?

A 0.67 N **B** 4.0 N **C** 6.0 N **D** 9.0 N

10. June/2023/Paper_0625/11/No.9

An irregularly shaped metal plate is freely suspended from a point P and is in equilibrium, as shown. Point Q is vertically below P.



Which statement about the position of the centre of gravity of the metal plate is correct?

A It is at P.

B It is at Q.

C It is halfway between P and Q.

D Further investigation is needed to determine its position.

11. June/2023/Paper_0625/12/No.7

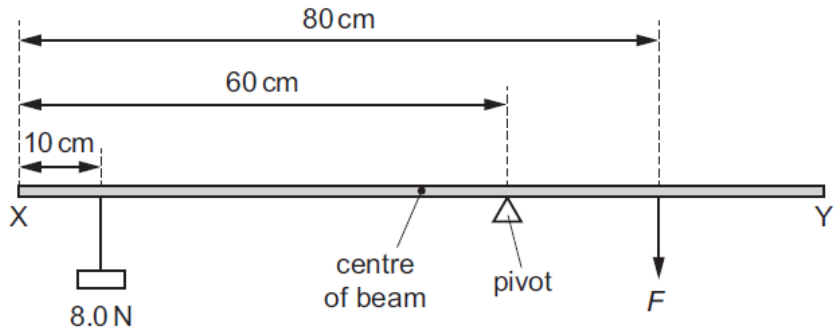
A uniform metre rule is pivoted in equilibrium at the 50 cm mark. A mass of 25 g is placed at the 30 cm mark on the rule.

What is the smallest mass that can be placed on the rule to restore equilibrium?

A 5 g **B** 10 g **C** 15 g **D** 25 g

12. June/2023/Paper_0625/12/No.8

A uniform beam XY is 100 cm long and weighs 4.0 N.



The beam rests on a pivot 60 cm from end X.

A load of 8.0 N hangs from the beam 10 cm from end X.

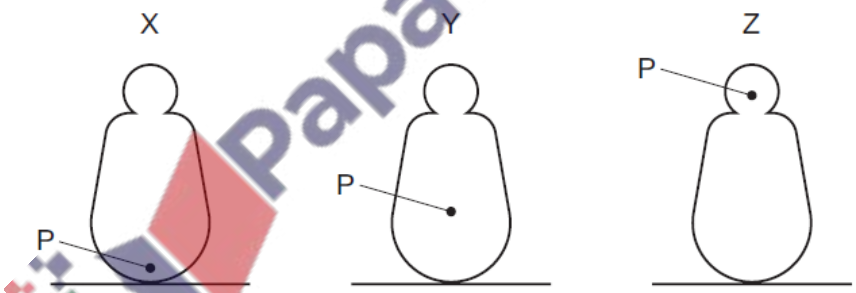
The beam is kept balanced by a force *F* acting on the beam 80 cm from end X.

What is the magnitude of force *F*?

A 8.0 N **B** 18 N **C** 22 N **D** 44 N

13. June/2023/Paper_0625/12/No.9

Three children's toys, X, Y and Z, are the same size and shape. They have weights at different positions inside so that the position of the centre of gravity of each toy is different. Each toy's centre of gravity is marked P.



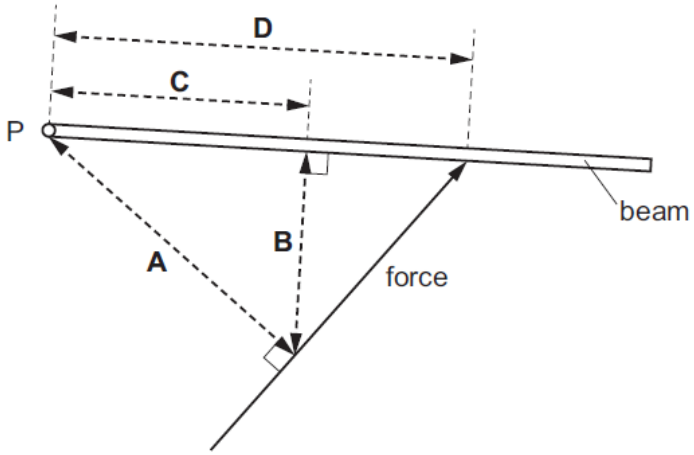
Which toy is the most stable and which toy is the least stable when balanced in the positions shown?

	most stable	least stable
A	X	Y
B	X	Z
C	Y	X
D	Y	Z

14. June/2023/Paper_0625/13/No.7

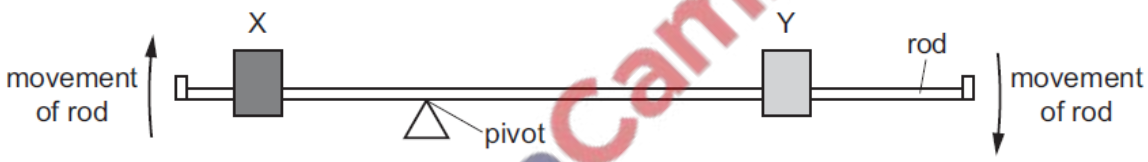
A beam is pivoted at P. A force is applied to the beam.

Which distance is multiplied by the force to give the moment of the force about P?



15. June/2023/Paper_0625/13/No.8

The diagram shows an unbalanced rod. Two loads X and Y can be moved along the rod.



The rod turns in a clockwise direction, as shown.

Which action could make the rod balance?

A moving X to the left

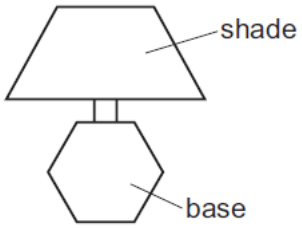
B moving X to the right

C moving Y to the right

D moving the pivot to the left

16. June/2023/Paper_0625/13/No.9

It is important that an electric table lamp with a lamp shade does not get knocked over easily.



Which statement is correct?

A The centre of mass must be as low as possible.

B The lamp must have a shade which is heavier than the base.

C The lamp must have a narrow base.

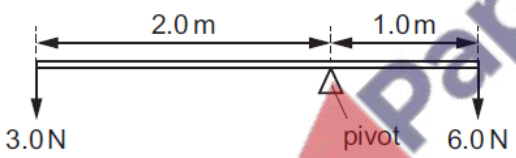
D The lamp shade must be wide.

17. June/2023/Paper_0625/21/No.8

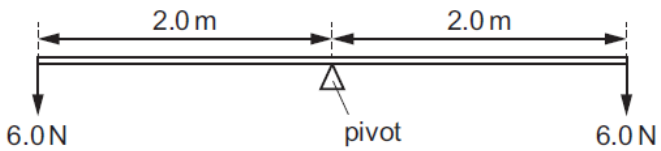
The diagrams show four beams, each of negligible weight and freely pivoted.

Which beam is **not** in equilibrium?

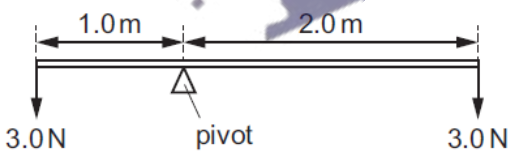
A



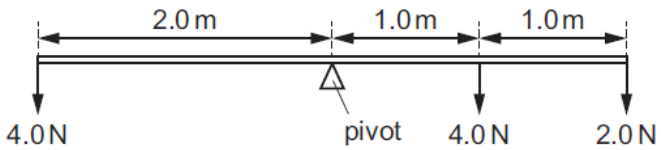
B



C



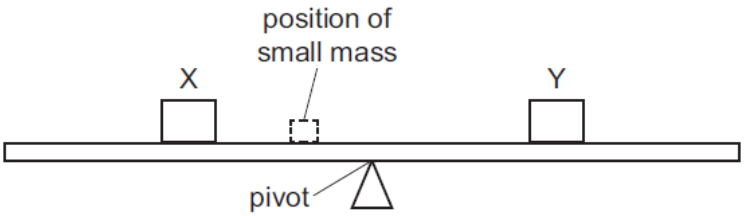
D



18. June/2023/Paper_0625/22/No.8

A uniform beam is pivoted at the centre and two identical masses, X and Y, are placed so that the beam balances.

A smaller mass is then added at the position shown.



How can the masses be positioned so the beam balances again?

A Move X away from the pivot.

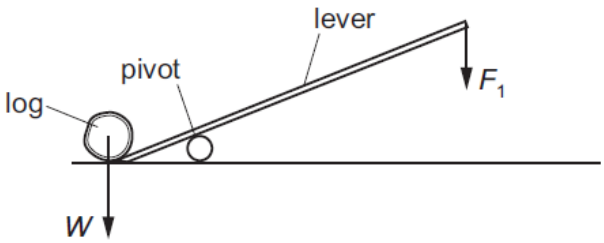
B Move X towards the pivot.

C Move Y towards the pivot.

D Move the small mass away from the pivot.

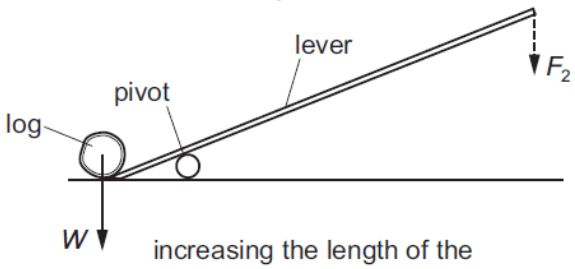
19. June/2023/Paper_0625/23/No.8

The diagram shows the minimum force F_1 acting vertically on a lever required to lift a heavy log of weight W.



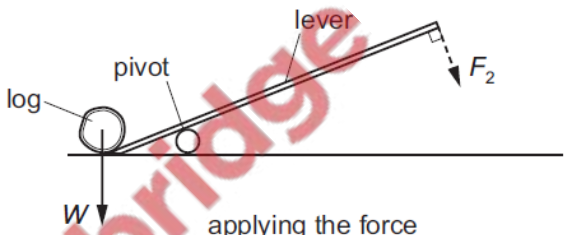
The log needs to be lifted by a smaller force than F_1. The diagrams show the changes tried. Each diagram has only **one** change from the original diagram. In each case, F_2 is the minimum force required to lift the log.

P



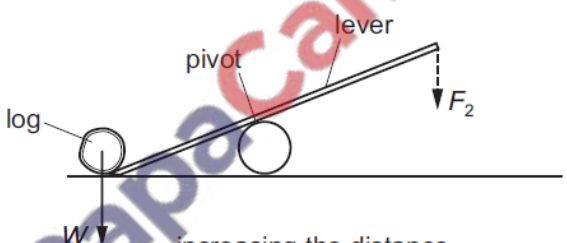
increasing the length of the lever to the right of the pivot

Q



applying the force perpendicular to the lever

R



increasing the distance from the log to the pivot

In which situations will F_2 be smaller than F_1?

A P, Q and R **B** P and Q only **C** P only **D** Q and R only

20. June/2023/Paper_0625/31/No.2(b, c, d)

Fig. 2.1 shows a concrete beam resting on the ground.

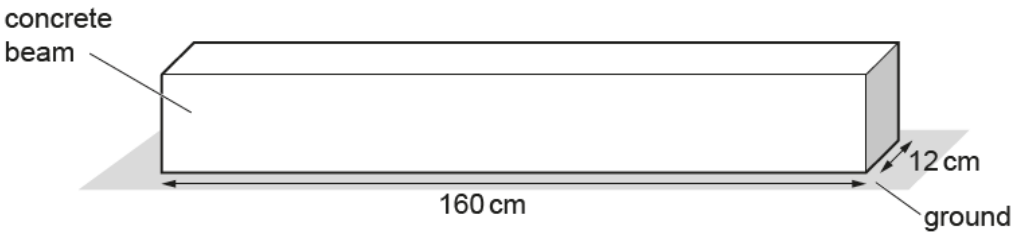


Fig. 2.1 (not to scale)

(b) A builder starts to raise one end of the beam.

He uses a force of 1030 N at a perpendicular distance of 120 cm from the pivot. Fig. 2.2 shows the arrangement.

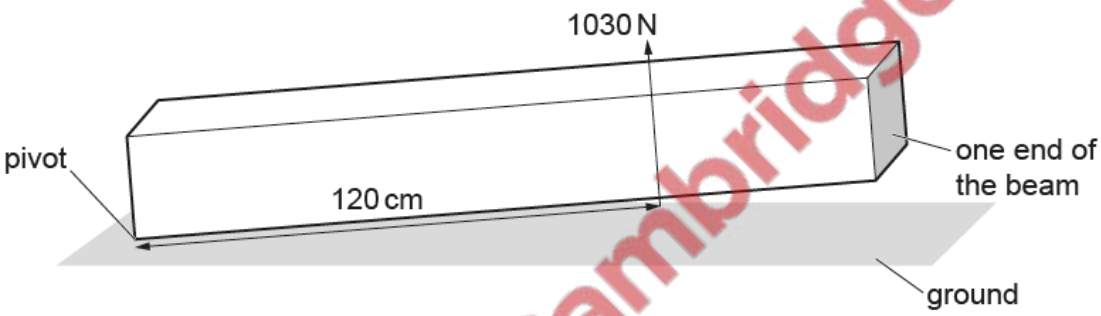


Fig. 2.2 (not to scale)

Calculate the moment of the 1030 N force about the pivot.

moment = ... N cm [3]

(c) Describe how the builder can use a smaller force to lift the beam.

..... [1]

(d) The builder positions the beam as shown in Fig. 2.3.

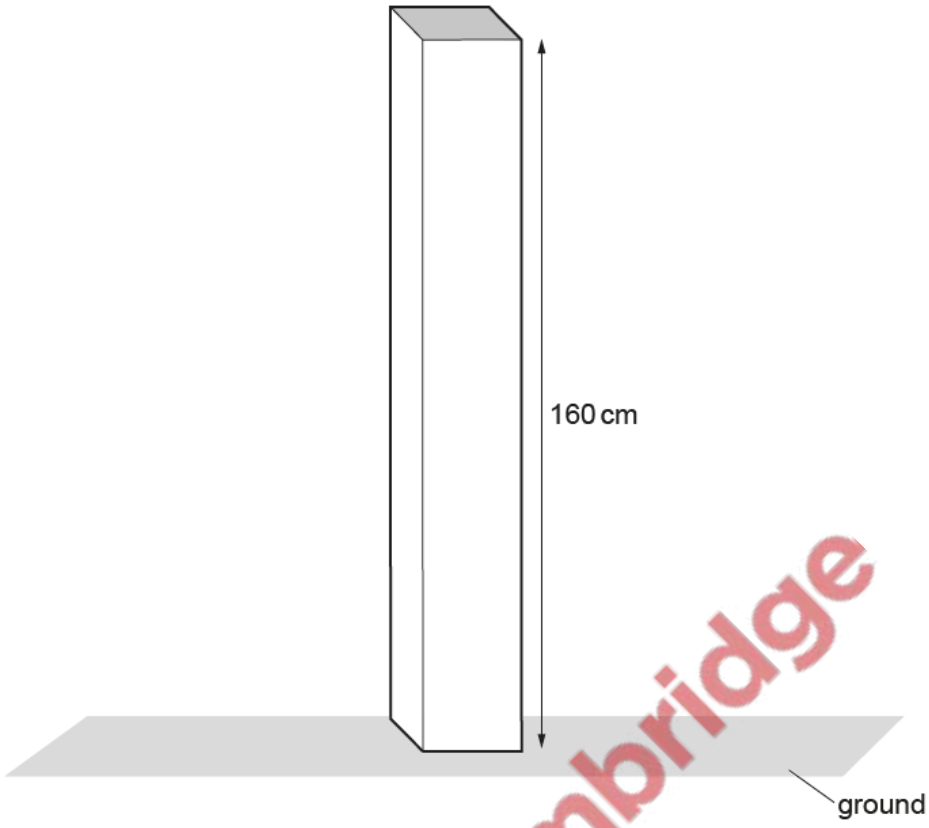


Fig. 2.3 (not to scale)

State why the beam shown in Fig. 2.3 is less stable than the beam shown in Fig. 2.1.

..... [1]

21. June/2023/Paper_0625/33/No.3

A student balances a beam on a pivot. They then balance block A and block B on the beam, as shown in Fig. 3.1.

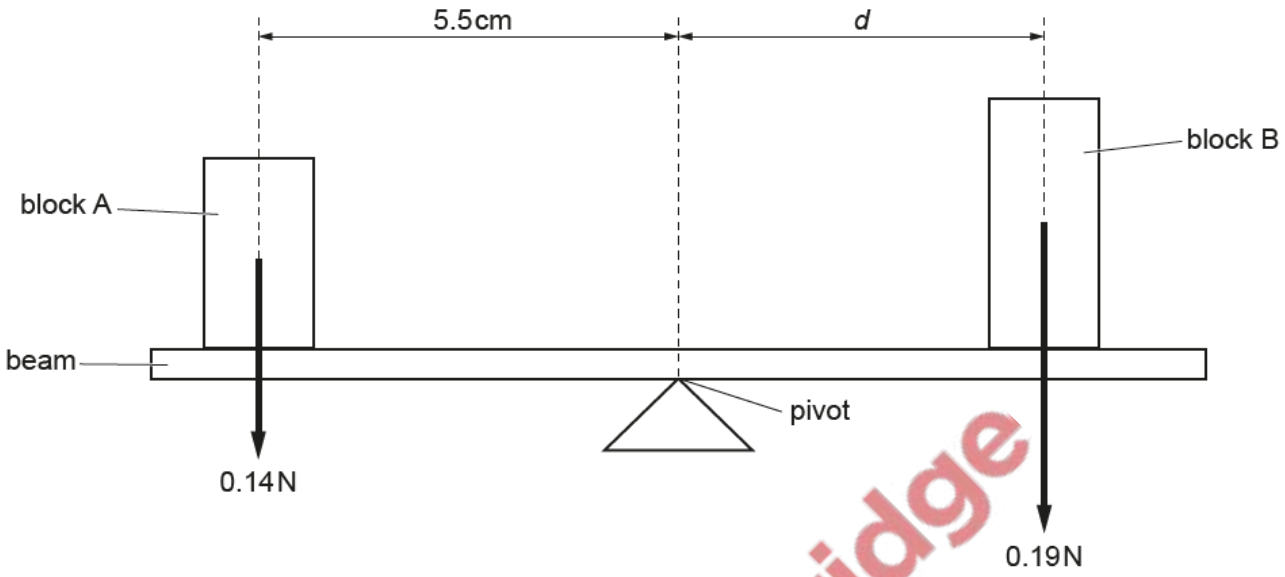


Fig. 3.1 (not to scale)

(a) (i) The weight of block A is 0.14 N.

Show that the moment of block A about the pivot is approximately 0.8 N cm.

[3]

(ii) The weight of block B is 0.19 N.

Calculate the distance *d* between the pivot and the centre of block B.

distance *d* = ... cm [3]

(b) The weight of block B is 0.19 N.

Calculate the mass of block B.

mass of block B = ... kg [3]

[Total: 9]