

MOMENT

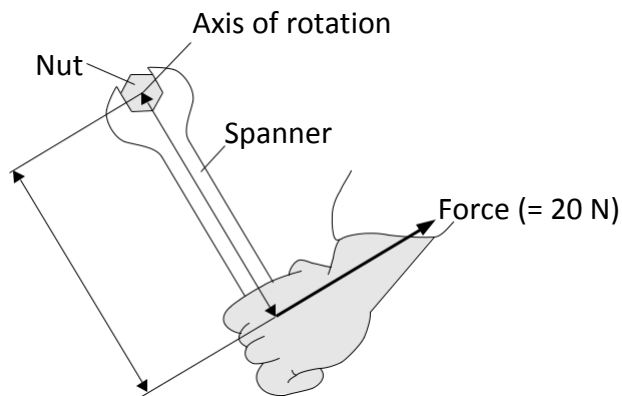
Q1 A spanner gives a turning effect to undo a nut.

(a) Complete the sentence.

The turning effect of a force is called the _____ of the force.

(1 mark)

(b) The diagram shows a spanner being used.



Use the equation in the box to calculate the spanner's turning effect in newton metres.

turning effect = force \times perpendicular distance from the line of action of the force to the axis of rotation

Show clearly how you work out your answer.

Turning effect = _____ Nm

(2 marks)

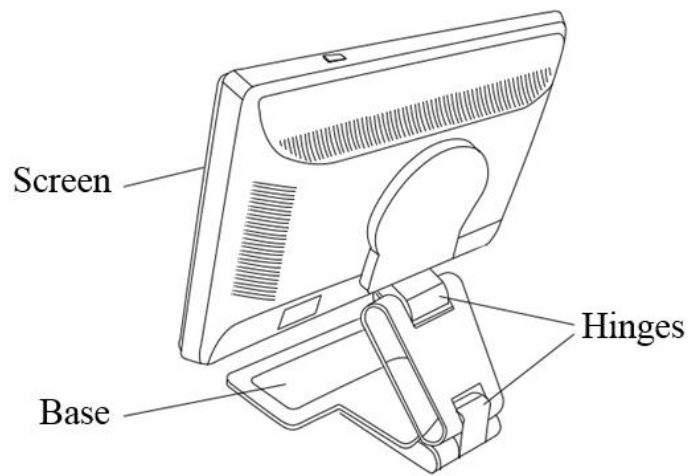
Give two ways in which you can increase the spanner's turning effect.

1.

2.

(2 marks)

Q2. The diagram shows a back view of a computer monitor.



(a) In normal use, the monitor is stable.

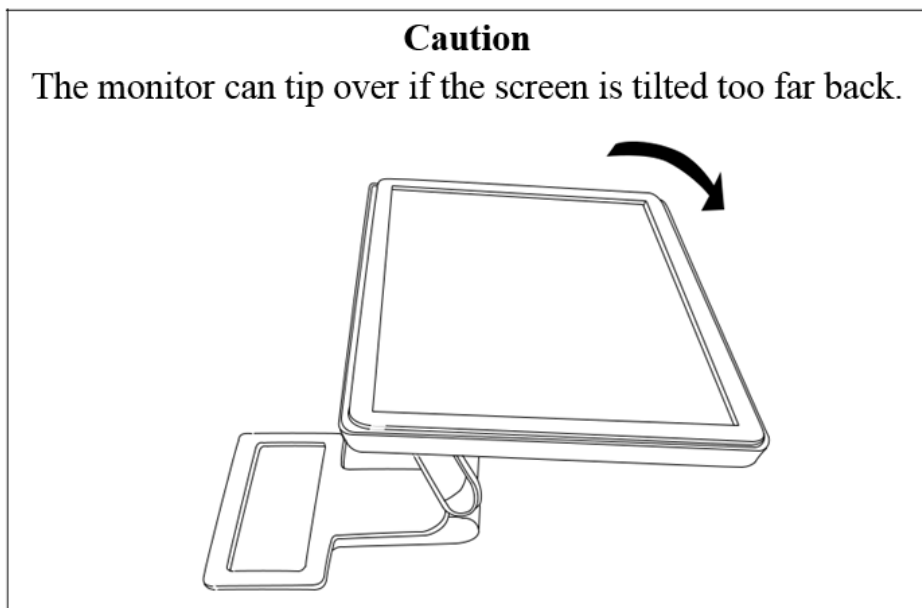
(i) Explain the meaning, in the above sentence, of the word stable.

(2 marks)

(ii) State the relationship between the total clockwise moment and the total anticlockwise moment about any axis of the monitor when it is stable.

(1 mark)

(b) The instruction booklet explains that the screen can be tilted. It also includes a warning.

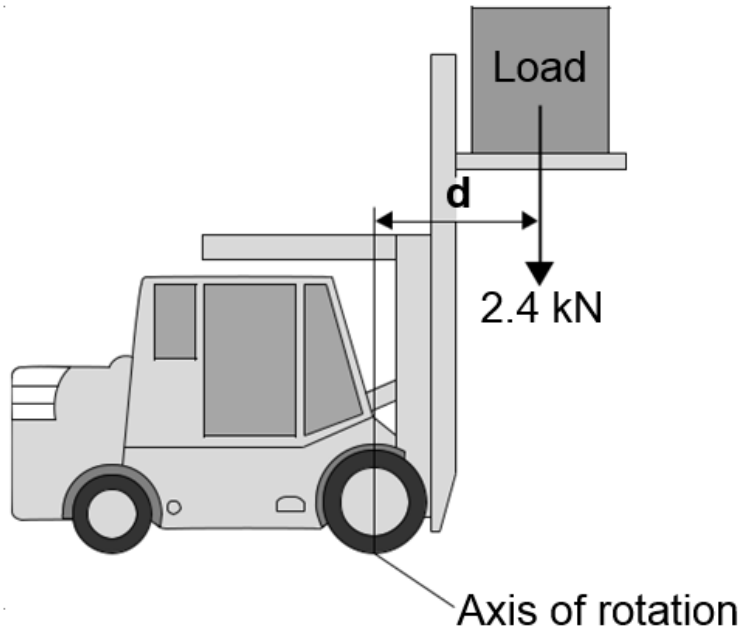


Explain why the monitor will tip over if the screen is tilted too far back.

Include the words centre of mass, weight and moment in your explanation.

(3 marks)

Q3 The diagram shows a fork-lift truck with a load of 2.4 kN. The clockwise moment caused by this load is 2880 Nm



Use the equation in the box to calculate the distance d .

$\text{turning effect} = \text{force} \times \text{perpendicular distance from the line of action of the force to the axis of rotation}$
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Show clearly how you work out your answer.

Distance $d =$ _____

(3 marks)

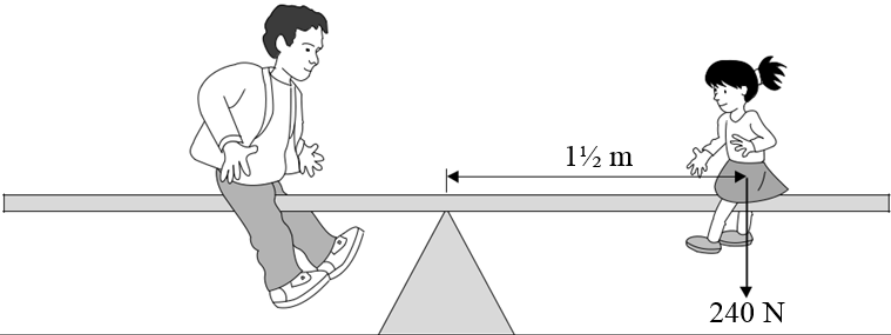
(b) This warning notice is in the driver's cab.

Warning
Maximum load 10.0 kN
This load must not be exceeded

Explain in terms of moments why the maximum load must not be exceeded.

(2 marks)

Q4 (a) The diagram shows the girl and her father on a see-saw.



(i) Use the equation in the box to calculate the moment of the girl.

turning effect = force × perpendicular distance from the line of action
of the force to the axis of rotation

Show clearly how you work out your answer.

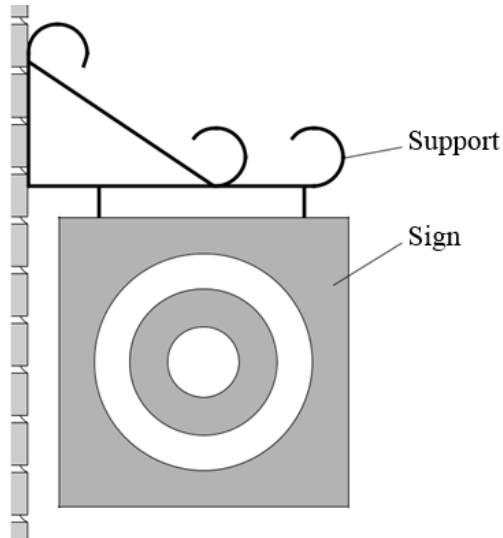
Turning effect of the girl = _____

Nm
(2 marks)

(b)(ii) What must her father do to increase his moment?

(1 mark)

Q5. The drawing shows a sign which hangs outside a shop.



(a) Draw an X on the sign so that the centre of your X is at the centre of mass of the sign.

(1 mark)

(b) One force which acts on the sign is its weight.

Complete the following sentence by drawing a ring around the correct line in the box.

The moment of the weight produces

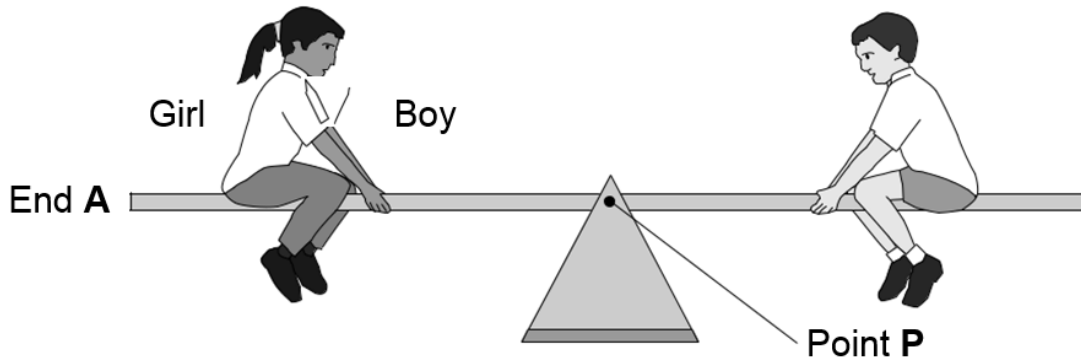
- | |
|-----------------|
| an accelerating |
| a balancing |
| a turning |

effect.

(1 mark)

Q 6. Two children visit a playground.

The diagram shows them on a see-saw. The see-saw is balanced.



Complete the following sentences by drawing a ring around the correct word or line in the box.

(a) (i) The turning effect of the girl's weight is called her force. load.
moment (1 mark)

(a) (ii) Point P is the axis of

balance
rotation
turning

 of the see-saw. (1 mark)

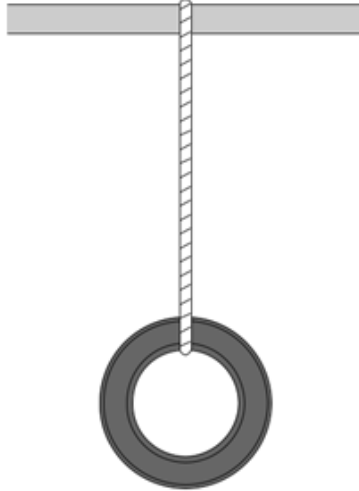
(a) (iii) To make end A of the see-saw go up,

the boy moves nearer to point P.
the girl moves nearer to point P.
the girl moves nearer to end A.

(1 mark)

(b) In another part of the playground, a tyre has been suspended from a bar.

(b) (i) Draw an X on the diagram so that the centre of the X marks the centre of mass of the tyre.



b) (ii) Complete the sentence by using the correct word or phrase from the box.

above	below	to the left of	to the right of
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If the suspended tyre is pushed, it will come to rest with its centre of mass directly

_____ the point of suspension.

(1 mark)

Total: 26 Marks