

Moments 1 Answers

- 1)
- (a) middle box ticked – moment B1
- (b) pivot/fulcrum B1
- (c) any four from: B4
- (heavier) boy has greater force/weight/moment
 - when (heavier) boy lifts feet initially tips clockwise
 - as boy moves his (clockwise) moment (about P) becomes less
 - as distance (of boy's weight) from the pivot decreases end B moves upward
 - see-saw level o.w.t.t.e (when) turning forces balanced/moments equal
 - then end A tips down as anticlockwise moment is greater

[Total: 6]

2)	force × distance (from pivot) OR 300×2.4 720 (N m)	C1 A1
	sum of clockwise moment = sum of anticlockwise moment $720 = W \times 1.6$ OR $720 \div 1.6$ 450 (N)	C1 C1 A1
		Total: 5

- 3)
- (a) turning effect OR force × distance (from fulcrum) [1]
- (b) (i) A AND idea of bigger distance from hinge / pivot [1]
- (ii) the door closes [1]
- 4)
- (i) (moment =) force × distance C1
(moment = $11\,000 \times 1.8$ =) 20 kNm A1
- (ii) (moment of weight = $19\,000 \times 1.25$ =) 24 (kNm) B1
correct statement based on two moments seen B1
- 5)
- (a) (immediately below/above the/at) 50 cm mark **OR** at pivot B1
- (b) (i) anticlockwise moment = clockwise moment **OR** $45 \times 0.40 = 25 \times W$ C1
 0.72 N A1
- (ii) 0.072 kg **OR** 72g e.c.f from (b)(i) B1
- (c) (i) no net moment **OR** two moments cancel C1
moment due to weight of rule cancels moment due to weight of apple A1
- (ii) weight of the rule/it is bigger B1

[Total: 7]

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- 6)
- (a) no resultant/net force (acting) B1
no resultant/net moment (acting)
OR clockwise moment = anticlockwise moment B1
- (b) (i) $W = P + Q$ in any form
OR (total) upward force = (total) downward force B1
 $P = W - Q$ so P must be less than W
OR P is not the only upward force B1
- (ii) $P \times$ its distance (from C) = $W \times$ its distance (from C)
OR P and W have equal moments (about C)
OR clockwise moment = anticlockwise moment B1
 P is farther from C/pivot (than W so P must be less than W) B1
- (c) clockwise moment = 75×0.24 C1
anticlockwise moment = $F \times 0.75$ C1
(moments equated gives $F =$) 24 N A1

[Total: 9]