

Eduqas Physics GCSE
Topic 3.3: Moments, levers, and
gears
Mark Schemes for Questions by topic

1.

(a) (sum of) clockwise moments (about a point) =(sum of) anticlockwise moments **(1)**

(for a system) in equilibrium **(1)**

accept balanced not stationary

2

(b) $(780 \times 0.35 =) 270 \text{ (Nm) (1) (273)}$

Nm (1) or newton metre(s) accept Newton metre(s)
(not J, nm or nM, Nms, etc)

2

(c) $(b) + (1100 \times 0.60) \text{ (1)}$

$(=) F_A \times 1.3 \text{ (1) } (F_A = 660 + 273/1.3 \text{ gets both marks})$

$(= 933/1.3) = 720 \text{ (N) (1) (717.7 or 715 for use of 930)}$
ecf (b)

2 sf only (1)

independent mark

4

(d) $(780 + 1100 - (c)) = 1200 \text{ (1) (1162 N)}$

ecf (c)

1

2.

- (a) product of the force and the **perpendicular distance (1)**
reference to a point/pivot **(1)**

2

- (b) (i) since W is at a greater distance from A **(1)**
then W must be less than P if moments are to be equal **(1)**
- (ii) P must increase **(1)**
since moment of girl's weight increases as she moves from A to B **(1)**
correct statement about how P changes
(e.g. P minimum at A, maximum at B, or P increases in a
linear fashion) **(1)**

max 4

[6]

3 (a). B

4.

- (a) 960 (Nm)

1

see-saw is in equilibrium

accept see-saw is balanced

see-saw is stationary is insufficient

1

(total) clockwise moments = anticlockwise moment

accept no resultant moment

forces are balanced is insufficient

*an answer clockwise moments balance the anticlockwise moments
gains 2 marks*

1

- (b) (i) 600 (Nm)

1

- (ii) 375 (N) **or** their (b)(i) \div 1.6 correctly calculated

do not credit if (b)(i) is larger than 960

allow 1 mark for correct substitution and transformation ie

$$\frac{600}{1.6} \text{ or } \frac{\text{their (b)(i)}}{1.6}$$

2

[6]

5. (a) (i) 75
allow 1 mark for correct substitution ie 250×0.3
*do **not** credit if subsequent step shown*
allow 1 mark for an answer 7500 2
- (ii) Nm 1
- (b) force is (applied) further from the nut / pivot / axis of rotation
handle is longer is insufficient
*do **not** accept less force needed* 1
- moment (on wrench) is larger 1
- [5]**
- 6.
- (a) *idea*
- line of action of weight/force/gravity
 (if drawn: a vertical line through the centre of mass)
 - falls outside the (wheel) base (mark NOT from diagram)
for 1 mark each 2
- (b) ideas that
- less stable/topples more easily
 - centre of mass at a higher level
 - so need small angle to make line of action of weight fall outside (wheel) base
for 1 mark each 3
- (c) idea that
- this is the most unstable condition (when bus used)
or
 this makes c. of m. as high as it is likely to be
for 1 mark 1
- [6]**
7. lever
- turning effect
- pivot
- for 1 mark each*
- [3]**