1

moment = 252

1

*allow 252 with no working shown for **2** marks*
*allow 25200 with no working shown for **1** mark*

(b) the clockwise moment (of child B) decreases

1

making it is less than the anticlockwise moment (of child A)
accept so moments are no longer balanced

1

so child A moves downwards

or

so child B moves upwards

1

[5]

M2. (a) centre of **X** at the centre of the concentric circles
judge by eye that the intention is correct

1

(b) drawn from any corner to the diagonally opposite corner

judge by eye that the intention is correct

or from the mid-point of any side to the mid-point of the opposite side

if more than one axis of symmetry has been drawn, accept only if both / all are correct

1

(c) a turning

accept any unambiguous indication

1

[3]

M3. lever

turning effect

pivot

for 1 mark each

[3]

M4. (a) (i) moment

1

(ii) rotation

1

(iii) the girl moves nearer to point **P**

1

(b) (i) **X** drawn in the centre of the space enclosed by the tyre
judge by eye

1

(ii) below

1

[5]

M5. (a) 1250
*allow **1** mark for correct substitution*
ie 500 × 2.5 provided there is no subsequent calculation

2

(b) (i) smaller than

1

(ii) force (exerted) further from axis of rotation (than the weight)
accept pivot for axis of rotation

1

(c) increase the force (exerted)
*do **not** accept increase distance of force from axis of rotation*

1

[5]

M6. (a) **C**

1

(b) moment

accept any unambiguous correct indication

1

(c) bigger than

accept any unambiguous correct indication

1

(d) 120 (Ncm)

*allow **1** mark for correct substitution*
ie 12 × 10

2

[5]

M7. (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]

M8. (a) 360

*allow **1** mark for correct substitution ie 300 × 1.2 provided no subsequent step shown*

2

(b) the force is applied further from the axis of rotation

accept pivot / (tree) stump for 'axis of rotation'

1

or

this increases the moment of the force

increases the force on the (tree) stump

1

[4]

M9. (a) centre of X drawn at centre of pendulum bob

judged by eye

accept dot drawn at centre of circle

1

(b) (i) 2

*allow **1** mark for correct substitution, ie* $\frac{1}{0.5}$ *provided no subsequent step shown*

2

(ii) 30**or**60 ÷ their (b)(i) correctly calculated

allow 1 mark for $\frac{60}{2}$

or $\frac{60}{\text{their (b)(i)}}$

or *0.5 × 60*

provided no subsequent step shown

2

(c) 51.2

*allow **1** mark for correct substitution, ie 64 × 0.8 provided no subsequent step shown*

2

(d) it increases (the moment)

must be comparative

*accept **1** mark for calculation of the moment = 64 (Nm)*

1

[8]

M10. (a) 3000

*allow **1** mark for correct substitution, ie 600 × 5 provided no subsequent step*

2

(b) anticlockwise moment

must be both words

1

(c) (i) 3400

allow 3.4 kilo (newtons)

1

(ii) as the distance (of the girl from point A) increases, force F increases

allow gets bigger for increases

force is (directly) proportional to distance will negate any correct response

1

[5]

M11. (a) make the rod longer

1

push down on the rod with a greater force

1

(b) particles are close together

1

so no room for more movement
dependent on 1st marking point

1

(c) (i) downward force produces pressure in liquid
reference to compression of liquid negates this mark

1

this pressure is the same at all points in a liquid
or
this pressure is transmitted equally through the liquid

and $P = F / A$ ***or*** $F = P \times A$

1

area (at load) bigger *(so force bigger)*

1

(ii) the force acting on the car moves less distance than the effort force

1

[9]