

# MOMENTS MARK SCHEMES

## Question 1

question	answers	extra information	mark
(a)	moment	or torque do <b>not</b> credit leverage	1
(b)	4 (2)	either 0.20 20 or allow 400 (1) (1)	2
(c)	use a longer spanner or fit a pipe over the (end of the) spanner (to lengthen it)  use a greater force / pull	or increases the perpendicular distance / length  note lever refers to spanner note <u>change</u> the . . . (0) ignore references to wider / larger nut  either order	1       1
<b>Total</b>			<b>5</b>
<b>Question 2</b>			
(a)(i)	will not fall over (1)	accept will not easily fall over (2)	2

	<p><b>or</b></p> <p>centre of mass will remain above the base (1)</p> <p>if the monitor is given a small push (1)</p>	<p>(line of action of the) weight will remain above within the base</p> <p>accept centre of gravity / c of g / c of m / c m</p> <p>depends on mark above</p>	
(a)(ii)	<p>(total) clockwise moment = (total) anticlockwise moment</p>	<p><b>or</b> they are equal / balanced</p>	1
(b)	<p>the position of the <u>centre of mass</u> has changed (1)</p> <p>the line of action of the <u>weight</u> is outside the base (1)</p> <p>producing a (resultant) <u>moment</u> (1)</p>	<p>points may be expressed in any order</p>	3
<b>Total</b>			<b>6</b>
<b>Question 3</b>			
(a)	<p>1.2</p> <p>metre(s)/m</p>	<p>allow <b>1</b> mark for conversion of 2.4 kN to 2400 N or for correct transformation without conversion</p> <p>ie <math>d = 2880 \div 2.4</math></p>	2
(b)	<p>any <b>two</b> from:</p>		2

	<ul style="list-style-type: none"> <li>as the load increases the (total) clockwise moment increases</li> <li>danger is that the fork lift truck / the load will topple / tip forward</li> <li>(this will happen) when the total clockwise moment is equal to (or greater than) the anticlockwise moment</li> <li>(load above 10.0 kN) moves line of action (from C of M) outside base (area)</li> </ul>	accept moments will not be balanced	
<b>Total</b>			<b>5</b>
<b>Question 4</b>			
(i)	360 (Nm)	credit either 240 1 % or 240 1.5 with <b>1</b> mark	2
(ii)	move to(wards) the left / to(wards) the / his end	or move away from the centre / pivot / axis (of rotation)  or move away from the girl / the child / his daughter	1
<b>Total</b>			<b>3</b>
<b>Question 5</b>			
(a)	centre of <b>X</b> at the centre of the concentric circles	judge by eye that the intention is correct	1
(b)	a turning	accept any unambiguous indication	1

<b>Total</b>			<b>2</b>
<b>Question 5</b>			
(a)(i)	moment		1
(a)(ii)	rotation		1
(a)(iii)	the girl moves nearer to point <b>P</b>		1
(b)(i)	<b>X</b> drawn in the centre of the space enclosed by the tyre	judge by eye	1
(b)(ii)	below		1
<b>Total</b>			<b>5</b>