

Question Number	Answer	Mark
15(a)	Point through which weight may be taken to act (1)	1
15(b)(i)	<p>Determines distance from hinge to centre of gravity of ladder (0.50 m) (1)</p> <p>Use of moment = <math>Fx</math> (1)</p> <p>Moment (of weight of ladder about hinge) = 27 (N m)  <b>and</b>  moment (of weight of board about hinge) = 22.5 (N m)  <b>Or</b>  combined moment (of weight of ladder and board about hinge) = 4.5 (N m) (1)</p> <p>Combined moment (of the weights of the board and ladder about the hinge) is clockwise.  <b>Or</b>  clockwise moment is greater than anticlockwise moment (1)</p> <p>The block causes a force / moment so the resultant moment (on ladder and board) is zero (1)</p> <p><u>Example calculation</u>  Distance from hinge to centre of gravity of ladder = <math>\left(\frac{2.7 \text{ m}}{2} - 0.85 \text{ m}\right)</math>  Clockwise moment = <math>54 \text{ N} \times (0.50 \text{ m}) = 27 \text{ N m}</math>  Anticlockwise moment <math>50 \text{ N} \times 0.45 \text{ m} = 22.5 \text{ N m}</math></p>	5
15(b)(ii)	<p>Use of moment = <math>Fx</math> <b>and</b> difference in moments from (b)(i) (1)</p> <p>Force = 5.6 N (ecf from(b)(i)) (1)</p> <p>If no other mark scored, allow 1 mark for a force calculated using a distance of 0.80 m with a valid moment using data from the question</p> <p><u>Example calculation</u>  Resultant moment = <math>27 \text{ N m} - 22.5 \text{ N m} = 4.5 \text{ N m}</math>  <math>F = \frac{4.5 \text{ N m}}{0.80 \text{ m}} = 5.63 \text{ N}</math></p>	2
Total for question 15		8