

Question Number	Answer	Mark
13(a)	<ul style="list-style-type: none"> X is the force (or pull or tension) of the <u>wire</u> (on the flagpole) (1) (accept tension in the wire) Y is force (or reaction or push, ignore "normal") of the <u>hinge</u> (or <u>wall</u>) (on the flagpole). (1) (1) Z is weight or force of gravity (of/on the flagpole) (1) 	3
13(b)	<ul style="list-style-type: none"> Use of moment of a force = Fx (1) Use of the principle of moments (1) (1) $T = 323 \text{ (N)} < 350 \text{ (N)}$ so wire will not break <p>Or</p> <p>Moment of weight about hinge = $88.3 \text{ (Nm)} < 95.8 \text{ (Nm)}$, max poss from wire</p> <p>Or</p> <p>Correct conclusion based on comparison of student's value with 350 N or 95.8 Nm</p> <p>MP3 depends on MP1 and MP2 being seen</p> <p><u>Example of calculation</u></p> $(15 \text{ kg} \times 9.81 \text{ N kg}^{-1} \times 0.6 \text{ m}) - (T \sin 20^\circ \times \frac{2}{3} \times 1.2 \text{ m}) = 0$ $T = (15 \text{ kg} \times 9.81 \text{ N kg}^{-1} \times 0.6 \text{ m}) \div (0.8 \text{ m} \times \sin 20^\circ)$ $= 88.29 \text{ Nm} \div 0.2736$ $T = 322.7 \text{ N}$ <p>max available moment = $350 \text{ N} \times 0.8 \text{ m} \times \sin 20^\circ = 95.77 \text{ Nm} > 88.29 \text{ Nm}$</p>	3
Total for question 13		6