

Question Number	Answer	Mark
13(a)(i)	<p>Use of <math>W = mg</math> (1)</p> <p>Use of suitable trigonometry to calculate lift (1)</p> <p>Use of suitable trigonometry to calculate resultant force (1)</p> <p>Use of <math>F = mv^2/r</math> (1)</p> <p><math>r = 820</math> (m) (at least 2 s.f.) (1)</p> <p><u>Example of calculation</u></p> <p><math>W = 1200 \text{ kg} \times 9.81 \text{ N kg}^{-1}</math>  <math>= 11772 \text{ N}</math>  <math>L = W / \cos \theta = 11772 \text{ N} / \cos 20^\circ</math>  <math>= 12527 \text{ N}</math>  <math>L_h = L \sin \theta = 12527 \text{ N} \times \sin 20^\circ = 4285 \text{ N}</math></p> <p><math>4285 \text{ N} = mv^2/r = 1200 \text{ kg} (54 \text{ m s}^{-1})^2 / r</math>  <math>r = 816 \text{ m}</math></p>	5
13(a)(ii)	<p>Use of <math>v = 2\pi r/T</math></p> <p><b>Or</b> Use of <math>v = r\omega</math> <b>and</b> <math>\omega = 2\pi/T</math> (1)</p> <p><math>t = 24 \text{ s}</math> (ecf from a(i)) (1)</p> <p><u>Example of calculation</u></p> <p><math>t = (2\pi \times 816 \text{ m} / 4) / 54 \text{ m s}^{-1}</math>  <math>t = 23.8 \text{ s}</math></p>	2
13(b)	<p>An explanation that makes reference to:</p> <p>Resultant upwards force</p> <p><b>Or</b> lift is greater than weight</p> <p><b>Or</b> vertical component of lift is now greater than weight (1)</p> <p>Aeroplane will accelerate upwards (1)</p>	2
<b>Total for question 13</b>		<b>9</b>