Question Number	Answer	Mark
12(a)	**Either** Decrease of GPE = gain of KE. **(1)** Use of $E_k = ½\ m\ v^2$ and $\Delta E_{grav} = m\ g\ \Delta h$ **(1)** $v = 3.1$(m s^{-1}) **(1)** **Or** Use of trigonometry to find parallel component of g **and** distance along ramp **(1)** Use of $v^2 = u^2 + 2\ a\ s$ (or other valid *suvat* method) **(1)** $v = 3.1$(m s^{-1}) **(1)** (reverse calculations can score maximum 2 marks) <u>Example of calculation</u> $½\ m\ v^2 = m\ g\ \Delta h$ $½\ v^2 = 9.81$ m s^{-2} × 0.5 m $v = \sqrt{(2 \times 9.81\ \text{m s}^{-2} \times 0.5\ \text{m})} = 3.13$ m s^{-1}	**3**
12(b)	Use of Pythagoras' Theorem to calculate distance along the ramp **Or** Use of trigonometry to find parallel component of g **(1)** Use of s = ½ (u + v) t (or other valid *suvat* method for t_{AB}) **(1)** Use of $s = u\ t$ **(1)** Total time = 1.64 s (show that value gives 1.65 s) **(1)** (may see some MPs for (b) in (a)) <u>Example of calculation</u> Distance along ramp = ($\sqrt{(2^2 + 0.5^2)}$) m = 2.06 m 2.06 m = ½ (0 + 3.13) m s^{-1} × t_{AB} t_{AB} = 2 × 2.06 m / 3.13 m s^{-1} = 1.32 s t_{BC} = 1 m / 3.13 m s^{-1} = 0.32 s Total time = 1.32 s + 0.32 s = 1.64 s	**4**
	Total for question 12	**7**