

2.5: Selected Answers

¹ $r_2 = 1.4 \text{ m}$

² $t_2 = 1.45 \text{ m}$

³ $t_3 = 3.4 \text{ s}$

⁴ $t_3 = 4.55 \text{ s}$

⁵ $r_3 = 36.6 \text{ m}$

⁶ $r_3 = 3520 \text{ m}$

⁷ $r_2 = 14.9 \text{ m}$

⁸ $r_4 = 2000 \text{ m}$

⁹ $t_4 = 3.7 \times 10^5 \text{ s}$

¹⁰ $t_2 = 14.9 \text{ s}$

¹¹ $t_2 = 7.8 \text{ s}$

¹² $t_3 = 15.7 \text{ s}$

¹³ $t_3 = 2.87 \text{ s}$

¹⁴ $F_{\text{rope}} = 420 \text{ N}$

¹⁵ $F_{\text{cushion}} = 1910 \text{ N}$

¹⁶ $a \geq 4.49 \text{ m/s}^2$

¹⁷ $t_2 = 17.1 \text{ s}$ to reach ground

¹⁸ $F_{\text{cushion}} = 2830 \text{ N}$

¹⁹ $F_{\text{ground}} = 43700 \text{ N}$

²⁰ $r_3 = 63.5 \text{ m}$

²¹ $r_3 = 1550 \text{ m}$

²² $m_{\text{block}} = 240 \text{ kg}$

²³ $m_{\text{block}} = 26 \text{ kg}$

²⁴ $F_{\text{rope}} = 500 \text{ N}$

²⁵ $F_{\text{rope}} = 466 \text{ N}$

²⁶ a. $F_{\text{scale}} = 755 \text{ N}$ b. $F_{\text{scale}} = 780 \text{ N}$

²⁷ a. $v = 17.5 \text{ m/s}$ b. $t = 17.1 \text{ s}$

²⁸ a. $v = 116 \text{ m/s}$ b. $t = 26.8 \text{ s}$

²⁹ a. $v = 12.5 \text{ m/s}$ b. $F_{\text{ground}} = 43700 \text{ N}$

³⁰ $t_2 = 0.89 \text{ s}$ $r_2 = 1.78 \text{ m}$

³¹ $m_{\text{student}} = 94 \text{ kg}$

³² $v_2 = 6.0 \text{ m/s}$

³³ Student falls 5.0 m in 3.03 s

³⁴ $v_2 = 1.5 \text{ m/s}$

³⁵ $v_1_{\text{slowship}} = 0.029c = 8.73 \times 10^6 \text{ m/s}$

³⁶ $v_2_{\text{fastship}} = 0.052c = 1.56 \times 10^7 \text{ m/s}$

³⁷ $v_2_{\text{ship}} = 24.3 \text{ m/s}$

³⁸ $v_{\text{probe}} = 667 \text{ m/s}$

³⁹ $v_2 \text{ platform} = 0.28 \text{ m/s}$

⁴⁰ $v_2 \text{ platform} = 0.025 \text{ m/s}$

⁴¹ $v_2 \text{ balloon} = 6.3 \text{ m/s}$

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