

P419 78, 81, 82

(78)

1st

$$u = 0$$

$$a = -9.81 \text{ ms}^{-2}$$

$$t_1 = t$$

$$s$$

2nd

$$u = -25.0 \text{ ms}^{-1}$$

$$a = -9.81 \text{ ms}^{-2}$$

$$t_2 = t - 2.00 \text{ s}$$

(same displacement)

(a)

$$s = ut + \frac{1}{2}at^2$$

$$s = ut + \frac{1}{2}at^2$$

$$\frac{1}{2}(-9.81 \text{ ms}^{-2})t^2 = (-25.0 \text{ ms}^{-1})(t - 2.00 \text{ s}) + \frac{1}{2}(-9.81 \text{ ms}^{-2})(t - 2 \text{ s})^2$$

$$-4.905t^2 = -25t + 50 + -4.905(t^2 - 4t + 4)$$

$$-4.905t^2 = -25t + 50 - 4.905t^2 + 19.62t - 19.62$$

$$0 = -5.38t + 30.38$$

$$t = \underline{5.65 \text{ s}}$$

$$(b) s = \frac{1}{2}at^2$$

$$= \frac{1}{2}(-9.81 \text{ ms}^{-2})(5.65 \text{ s})^2$$

$$= -156.58 \text{ m}$$

∴ Building is 157 m high

(c) 1st

$$u = 0$$

$$a = -9.81 \text{ ms}^{-2}$$

$$t = 5.65 \text{ s}$$

$$v = u + at$$

$$= -9.81 \text{ ms}^{-2}(5.65 \text{ s})$$

$$v = \underline{-55.4 \text{ ms}^{-1}}$$

2nd

$$u = -25 \text{ ms}^{-1}$$

$$a = -9.81 \text{ ms}^{-2}$$

$$t = 3.65 \text{ s}$$

$$v = u + at$$

$$= -25 \text{ ms}^{-1} + (-9.81 \text{ ms}^{-2})(3.65 \text{ s})$$

$$v = \underline{-60.8 \text{ ms}^{-1}}$$

(82)

$$\frac{8.71}{u = 1.5x}$$

$$a = -9$$

$$v = 0$$

$$s = ?$$

$$v^2 = u^2 + 2as$$

$$s = \frac{-u^2}{2a}$$

$$s_B = \frac{+2g}{+(1.5)^2(x)^2}$$

$$s_B = (1.5)^2 s_J$$

$$s_B = 2.25 s_J$$

$$\frac{Joe}{u = x}$$

$$a = -9$$

$$v = 0$$

$$s = ?$$

$$s_J = \frac{+2g}{+(x)^2}$$

(81)

$$v = \frac{f}{s} = \frac{1.1m}{2.5min} = 0.44 \text{ m min}^{-1}$$

$$\frac{.44}{.15} = 2.93 \approx 3 \text{ burgers min}^{-1}$$