

# Linear Motion Practice Problems 10-2-15

1 of 2

(Blue sheet)

①  $V_0 = 0$   
 $t = 2s$   
 $a = 30 \text{ m/s}^2$   
 $d = ?$   
 $V_f = ?$

$$\Delta x = V_0 t + \frac{1}{2} a t^2$$

$$\Delta x = \frac{1}{2} (30) (2)^2$$

$$= 15(4)$$

$$= 182 \text{ m } 60 \text{ m}$$

$$V_f = V_0 + at$$

$$V_f = (30 \text{ m/s})(2s)$$

$$V_f = 60 \text{ m/s}$$

②  $a = 3 \text{ m/s}^2$   
 $V_f = 65 \text{ m/s}$   
 $d = ?$   
 $V_0 = 0$

$$\Delta x = V_0 t + \frac{1}{2} a t^2$$

$$\Delta x = \frac{1}{2} (3 \text{ m/s}^2) ($$

↑ don't know  
 $t$ , so use  
 other eq

$$V_f^2 = V_0^2 + 2a(\Delta x)$$

$$\Delta x = \frac{V_f^2 - V_0^2}{2a}$$

$$= \frac{(65 \text{ m/s})^2 - (0)^2}{2(3 \text{ m/s}^2)}$$

$$= 704.17 \text{ m}$$

③  $a = 3.20 \text{ m/s}^2$   
 $t = 32.8 s$   
 $d = ?$

$$\Delta x = V_0 t + \frac{1}{2} a t^2$$

$$\Delta x = \frac{1}{2} (3.20 \text{ m/s}^2) (32.8s)^2$$

$$\Delta x = 1721.34 \text{ m}$$

④  $V_0 = 0$   
 $a = ?$   
 $t = 5.21 s$   
 $\Delta x = 110 \text{ m}$

$$\Delta x = V_0 t + \frac{1}{2} a t^2$$

$$a = \frac{2\Delta x}{t^2}$$

$$= \frac{2(110 \text{ m})}{(5.21s)^2}$$

$$= \frac{220 \text{ m}}{27.1441s^2} = 8.1049 \text{ m/s}^2$$

⑤  $V_0 = 18.5 \text{ m/s}$   
 $V_f = 46.1 \text{ m/s}$   
 $t = 2.47 s$   
 $a = ?$   
 $d = ?$

$$V_f = V_0 + at$$

$$a = \frac{V_f - V_0}{t}$$

$$= \frac{46.1 \text{ m/s} - 18.5 \text{ m/s}}{2.47s}$$

$$= 11.174 \text{ m/s}^2$$

$$\Delta x = V_0 t + \frac{1}{2} a t^2$$

$$= (18.5)(2.47) + \frac{1}{2} (11.174) (2.47)^2$$

$$= 79.78 \text{ m}$$

# Linear Motion Practice Problems

10-2-15

2022

6)  $V_0 = 0$

$V_f = 7.10 \text{ m/s}$

$\Delta x = 35.4 \text{ m}$

$a = ?$

~~$\Delta x$~~   $V_f^2 = V_0^2 + 2a\Delta x$

$$a = \frac{V_f^2 - V_0^2}{2\Delta x}$$

$$= \frac{(7.10)^2 - (0)^2}{2(35.4 \text{ m})}$$

$$= 0.712 \text{ m/s}^2$$

6b)  $V_f = 88.3 \text{ m/s}$

$d = 1365 \text{ m}$

$a = ?$

$V_0 = 0$

$$V_f^2 = V_0^2 + 2a\Delta x$$

$$a = \frac{V_f^2 - V_0^2}{2\Delta x}$$

$$= \frac{(88.3 \text{ m/s})^2 - (0)^2}{2(1365 \text{ m})}$$

$$= 2.85 \text{ m/s}^2$$

7)  $V_0 = 10 \text{ m/s}$

$V_f = -2 \text{ m/s}$

$t = 0.020 \text{ s}$

$a = ?$

$$V_f = V_0 + at$$

$$a = \frac{V_f - V_0}{t}$$

$$a = \frac{(-2) - (10)}{0.020 \text{ s}}$$

$$a = 600 \text{ m/s}^2$$