

# 物理

## W3

趙丞胤

$$3. a) 16 \cdot \cos 25^\circ \times 2.2 = 31.9 \text{ J}$$

b) 0 J, 桌子無移動

c) 0 J, 動垂直不作功

d) 0 J, 無加速度

$$e) -16 \cdot \cos 25^\circ \times 2.2 = -31.5 \text{ J}$$

f) 0 J, 無移動,  $d=0 \text{ m}$

P.140

$$15. a) \frac{5 \times 3}{2} = 7.5 \text{ J}$$

$$b) 5 \times 3 = 15 \text{ J}$$

$$c) \frac{5 \times 3}{2} = 7.5 \text{ J}$$

$$d) 7.5 \text{ J} + 7.5 \text{ J} + 15 \text{ J} = 30 \text{ J}$$

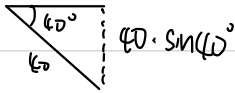
$$17. a) \frac{4}{2.5} = \frac{1.5}{x} \Rightarrow x = 0.9375 \text{ cm}$$

$$b) mg = kx$$

$$\Rightarrow k = 4 \times 9.8 \div 0.005 = 1568 \text{ N/m}$$

$$W = \frac{1}{2} kx^2 \Rightarrow \frac{1}{2} \cdot 1568 \cdot 0.0016$$

$$\Rightarrow 1.2544 \text{ J}$$



P. 142

41. a)  $F = mgh$

$$1) \textcircled{A} \Rightarrow 1000 \cdot 9.8 \cdot 40 \sin 40^\circ$$

$$= 251972.74 \text{ J}$$

$$2) \textcircled{B} \Rightarrow F = mgh^0 \Rightarrow 0 \text{ J}$$

$$3) 0 - 251972.74 = -251972.74 \text{ J}$$

$$b) 1) \textcircled{A} \Rightarrow 0 \text{ J}$$

$$2) \textcircled{B} \Rightarrow -251972.74 \text{ J}$$

$$3) -251972.74 \text{ J}$$

43.

$$a) 25 \times 5 = 125 \text{ J}$$

$$b) 10 \times 5 = 50 \text{ J} \quad x = y$$

$$c) W = \int \vec{F} \cdot d\vec{s} \rightarrow (dx + dy)$$

$$\Rightarrow \int (2y\hat{i} + x^2\hat{j}) \cdot (dx + dy) \quad y = x$$

$$\Rightarrow \int_0^5 (2y\hat{i} + dx) \cdot \int_0^5 (x^2 + dy)$$

$$\Rightarrow \int_0^5 (2x + dx) \cdot \int_0^5 (y^2 + dy)$$

$$\Rightarrow x^2 \Big|_0^5 + \frac{1}{3} x^3 \Big|_0^5$$

$$\Rightarrow 25 + \frac{125}{3}$$

$$\Rightarrow 66.667 \text{ J}$$

d) nonconservative

e) the work that the particle done depends on the path, so it is nonconservative.

P. 164

7.

$$a) (5-3) \cdot 9.8 = (5+3) \cdot a$$

$$a = 2.475 \text{ m/s}^2$$

$$\Rightarrow \frac{1}{2} a t^2 = 4$$

$$\Rightarrow \frac{1}{2} \cdot 2.475 \cdot t^2 = 4$$

$$\Rightarrow t = 1.7979 \text{ s}$$

$$v = 1.7979 \cdot 2.475 = 4.45 \text{ m/s} \quad \&$$

$$b) \frac{1}{2} m v^2 = m g h \text{ (能量守恒) 位能轉變成動能}$$

$$\Rightarrow \frac{1}{2} \cdot (4.45)^2 = 9.8 \cdot h$$

$$\Rightarrow h = 1.00 \text{ m}$$

$$4 + 1 = 5 \text{ m} \quad \&$$

$$15, a) \frac{1}{2} k x^2 = \frac{1}{2} m v^2$$

$$\Rightarrow \frac{1}{2} \cdot 500 \cdot 5^2 = \frac{1}{2} \cdot 2 \cdot v^2$$

$$\Rightarrow v^2 = 0.625$$

$$\Rightarrow v = 0.791 \text{ m/s}$$

$$b) f = \mu_s n$$

$$f = 0.350 \cdot (2 \cdot 9.8) = 6.93 \text{ N}$$

原功 - 摩擦後的功

$$\frac{1}{2} \cdot 2 \cdot 0.625 - 6.93 \cdot 0.05 = 0.279 \text{ J}$$

$$W = \frac{1}{2} m v^2$$

$$0.279 \text{ J} = \frac{1}{2} \cdot 2 \cdot v^2$$

$$v = 0.5277 \text{ m/s} \quad \&$$

P. 165

$$\geq 1. a) \frac{1}{2} m v^2 = \frac{1}{2} \cdot 5 \cdot 8^2 \\ = 160 \text{ J}$$

$$b) mgh = 5 \cdot 9.8 \cdot 1.5 \quad \begin{array}{c} \text{Diagram: A block on an inclined plane. The angle is } 30^\circ. \text{ The horizontal distance is } 3. \text{ The vertical height is } 3 \cdot \cos 30^\circ = 1.5. \end{array} \\ = 73.5 \text{ J}$$

$$c) 160 - 73.5 = 86.5 \text{ J} \\ \frac{86.5}{5} = 28.83 \text{ N}$$

$$d) F = \mu_k n \quad \begin{array}{c} \text{Diagram: A block on an inclined plane. The angle is } 30^\circ. \text{ The horizontal distance is } 3. \text{ The vertical height is } 3 \cdot \cos 30^\circ = 1.5. \end{array} \\ 28.83 = \mu \cdot 5 \cdot \cos 30^\circ$$

$$\Rightarrow \mu = \frac{28.83}{5 \cdot \cos 30^\circ}$$

$$\Rightarrow \mu = 0.679$$