

模块一 1.2 习题答案

1.2.1 答案:

$$F_{1x} = -F_1 \cos 30^\circ = -200 \times 0.866 = -173.2 \text{ N}$$

$$F_{1y} = -F_1 \sin 30^\circ = -200 \times 0.5 = -100 \text{ N}$$

$$F_{2x} = 0$$

$$F_{2y} = F_2 = -150 \text{ N}$$

$$F_{3x} = F_3 \cos 20^\circ = 200 \times 0.9397 = 187.94 \text{ N}$$

$$F_{3y} = F_3 \sin 20^\circ = 200 \times 0.342 = 68.4 \text{ N}$$

$$F_{4x} = -F_4 \sin 30^\circ = -250 \times 0.5 = -125 \text{ N}$$

$$F_{4y} = F_4 \cos 30^\circ = 250 \times 0.866 = 216.5 \text{ N}$$

1.2.2 答案:

$$T_x = 0 \quad T_y = 2(T_1 \sin 30^\circ + T_2 \sin 50^\circ) = 2(700 \times 0.5 + 600 \times 0.766) = 1014.4 \text{ N}$$

$$T = 1014.4 \text{ N} (\uparrow)$$

1.2.3 答案:  $N_{AB} = 32.4 \text{ KN}$      $N_{AC} = 45.85 \text{ KN}$

1.2.4 答案:  $R_B = 14.14 \text{ KN} (\swarrow)$      $R_{AX} = 10 \text{ KN} (\rightarrow)$      $R_{AY} = 10 \text{ KN} (\uparrow)$

1.2.5 答案:  $N_{BC} = 5 \text{ KN} (\text{压力})$      $R_{AX} = 4.33 \text{ KN} (\leftarrow)$      $R_{AY} = 2.5 \text{ KN} (\uparrow)$

1.2.6 答案:  $N_{BC} = 100 \text{ N} (\text{拉力})$      $N_{AB} = 122.8 \text{ N} (\text{拉力})$      $W = 136.8 \text{ N}$

1.2.7 答案:  $N_{AC} = 35.86 \text{ KN} (\text{压力})$      $N_{AB} = 9.28 \text{ KN} (\text{拉力})$

1.2.8 答案:  $N_{AC} = 136.6 \text{ KN} (\text{拉力})$      $N_{AB} = 242.9 \text{ KN} (\text{压力})$

1.2.9 答案: (a)  $N_{AC} = 1.15F$  (压力)     $N_{AB} = 0.577F$  (拉力)

(b)  $N_{AC} = 1.15F$  (拉力)     $N_{AB} = 0.577F$  (压力)

(c)  $N_{AC} = 0.866F$  (压力)     $N_{AB} = 0.5F$  (拉力)

(d)  $N_{AC} = 0.577F$  (拉力)     $N_{AB} = 0.577F$  (拉力)

1.2.10 答案:  $N_D = \frac{Fl}{2a}$  (压力)

1.2.11 答案:  $T = 173.2 \text{ KN} (\text{拉力})$      $N_A = 13.4 \text{ KN} (\text{压力})$

1.2.12 答案:  $N_{AB} = 1 \text{ KN}$      $N_{BC} = 1 \text{ KN}$      $N_{BD} = 1.414 \text{ KN}$      $N_{DE} = 1.575 \text{ KN}$   
 $N_{FD} = 1.15 \text{ KN}$

1.2.13 答案: (a)  $m_o(P) = Pl$     (b)  $m_o(P) = 0$     (c)  $m_o(P) = Pl \sin \alpha$

(d)  $m_o(P) = -Pa$     (e)  $m_o(P) = P(l+r)$     (f)  $m_o(P) = Pl \frac{\sin \beta}{\cos \alpha}$

1.2.14 答案: (1)  $m_o(F) = -0.3 \text{ KN}\cdot\text{m}$     (2)  $F_x = 0.577 \text{ KN} (\rightarrow)$

(3)  $F_{min} = 0.5 \text{ KN}$  (方向垂直于 OA 杆  $\searrow$ )    (4) 在 OA 杆上距 O 点 0.25m 处

1.2.15 答案:  $m_A(F) = -164 \text{ KN}\cdot\text{m}$  (顺时针方向转)

1.2.16 答案:  $m = -56.25 \text{ N}\cdot\text{m}$  (逆时针转)

1. 2. 17 答案: (1)  $R_A = 2.71\text{kN}(\uparrow)$  (2)  $R_B = 3.9\text{kN}(\nearrow)$  (3)  $R_A = 2.5\text{kN}(\nearrow)$

1. 2. 18 答案: (a)  $R_A = P/3(\downarrow)R_B = P/3(\uparrow)$  (b)  $R_A = P(\uparrow)R_B = P(\downarrow)$

(c)  $R_A = 0.471P(\searrow)R_B = 0.471P(\nearrow)$  (d)  $R_A = P(\uparrow)R_B = P(\downarrow)$

1. 2. 19 答案:  $R_A = 2\text{kN}(\downarrow)R_B = 2\text{kN}(\uparrow)$

1. 2. 20 答案:  $R_A = 0.75\text{kN}(\rightarrow)R_B = 0.75\text{kN}(\leftarrow)$

1. 2. 21 答案:  $R_{AX} = 25\text{kN}(\rightarrow)R_{AY} = -43.3\text{kN}(\downarrow)m = -3080\text{kN}\cdot\text{m}$ (顺时针转)

1. 2. 22 答案:  $R_{AX} = 72.2\text{N}(\rightarrow)R_{AY} = -125\text{N}(\downarrow)$

$$R_{BX} = -72.2\text{N}(\leftarrow)R_{BY} = 125\text{N}(\uparrow)$$

$$R_{CX} = -125\text{N}(\leftarrow)R_{CY} = 93.75\text{N}(\uparrow)$$

$$R_{DX} = 125\text{kN}(\rightarrow)R_{DY} = -93.75\text{N}(\downarrow)$$

$$R_{EX} = -125\text{kN}(\leftarrow)R_{EY} = 93.75\text{N}(\uparrow)$$

1. 2. 23 答案:  $R = 280\text{kN}(\downarrow)M_O = -33\text{kN}\cdot\text{m}$ (顺时针转)

1. 2. 24 答案:

(a)  $R_{Ax} = -20(\text{kN}) (\leftarrow)$ ;  $R_{Ay} = 28.8(\text{kN}) (\uparrow)$ ;  $R_{By} = 25.9(\text{kN}) (\uparrow)$

(b)  $R_{Ax} = 7.07(\text{kN}) (\rightarrow)$ ;  $R_{Ay} = 12.07(\text{kN}) (\rightarrow)$ ;  $m_A = 38.28(\text{kN}\cdot\text{m})$  (  )

(c)  $R_{Ax} = 3(\text{kN}) (\rightarrow)$ ;  $R_{Ay} = 1.875(\text{kN}) (\uparrow)$ ;  $R_{By} = 0.125(\text{kN}) (\uparrow)$

1. 2. 25 答案:

$R_{Ax} = 16.67(\text{kN}) (\rightarrow)$ ;  $R_{Ay} = 16.67(\text{kN}) (\uparrow)$ ;  $R_{By} = 26.66(\text{kN}) (\uparrow)$ ;  $R_{Cx} = -16.67(\text{kN})$   
( $\leftarrow$ );  $R_{Cy} = 16.67(\text{kN}) (\uparrow)$ ;

1. 2. 26 答案:

(a)  $R_{Ax} = 3(\text{kN}) (\rightarrow)$ ;  $R_{Ay} = 5(\text{kN}) (\uparrow)$ ;  $R_{By} = -1(\text{kN}) (\downarrow)$

(b)  $R_{Ax} = -3(\text{kN}) (\leftarrow)$ ;  $R_{Ay} = -0.25(\text{kN}) (\downarrow)$ ;  $R_{By} = 4.25(\text{kN}) (\uparrow)$

1. 2. 27 答案:

$R_{Ax} = -12(\text{kN}) (\leftarrow)$ ;  $R_{Ay} = 45(\text{kN}) (\uparrow)$ ;  $m_A = 27.8(\text{kN}\cdot\text{m})$  (  )

1. 2. 28 答案:

$R_{Ax} = -1.7(\text{kN}) (\leftarrow)$ ;  $R_{Ay} = 12(\text{kN}) (\uparrow)$ ;  $R_{By} = 11(\text{kN}) (\uparrow)$

1. 2. 29 答案:

$R_{Ax} = 0(\text{kN})$ ;  $R_{Ay} = 17(\text{kN}) (\uparrow)$ ;  $m_A = 33(\text{kN}\cdot\text{m})$  (  )

1. 2. 30 答案:

(a)  $R_{Ax} = 0(\text{kN})$ ;  $R_{Ay} = 113.3(\text{kN}) (\uparrow)$ ;  $R_{By} = 86.7(\text{kN}) (\uparrow)$

(b)  $R_{Ax} = 0(\text{kN})$ ;  $R_{Ay} = 19.3(\text{kN}) (\uparrow)$ ;  $R_{By} = 10.7(\text{kN}) (\uparrow)$

(c)  $R_{Bx} = 0(\text{kN})$ ;  $R_{By} = 16(\text{kN}) (\uparrow)$ ;  $m_A = 49(\text{kN}\cdot\text{m})$  (  )

(d)  $R_{Ax} = 0(kN)$  ;  $R_{Ay} = 20(kN)$  (  $\uparrow$  ) ;  $m_A = 40(kN \bullet m)$  (  $\curvearrowright$  )

(e)  $R_{Ax} = 0(kN)$  ;  $R_{Ay} = 5.8(kN)$  (  $\uparrow$  ) ;  $R_{By} = 89.2(kN)$  (  $\uparrow$  )

(f)  $R_{Ax} = 0(kN)$  ;  $R_{Ay} = 3.5(kN)$  (  $\uparrow$  ) ;  $R_{By} = 9.5(kN)$  (  $\uparrow$  )