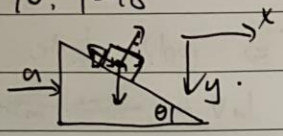
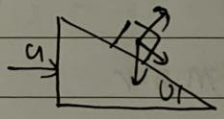
70. 1-48



a较小

$$\begin{cases} mg - F_N\cdot\cos\theta - F_f\cdot\sin\theta = 0 \\ F_N\cdot\sin\theta - F_f\cdot\cos\theta + m\cdot(-a) = 0 \\ F_f \le F_N\cdot\mu \end{cases}$$

$$\Rightarrow a_{min} = \frac{\sin\theta-\mu\cos\theta}{\mu\sin\theta+\cos\theta}\cdot g$$



a较大.

$$\begin{cases} mg - F_N\cos\theta + F_f\sin\theta = 0 \\ F_N\sin\theta + F_f\cos\theta + m(-a) = 0 \\ F_f \le F_N\cdot\mu \end{cases}$$

$$\Rightarrow a_{max} = \frac{\sin\theta+\mu\cos\theta}{\cos\theta-\mu\sin\theta}\cdot g$$

若 $\cos\theta-\mu\sin\theta>0$ 即 $\mu<\cot\theta<1$

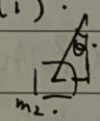
$\therefore a\in[a_{min}, a_{max}]$

若 $\cos\theta-\mu\sin\theta<0$ 即 $\mu>\cot\theta>1$.

则 $a\ge a_{min}$，无最大值

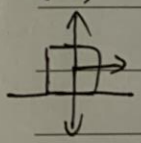
70. 1-49

(1).



$$\begin{cases} mg = F_T\cdot\cos\theta \\ F_T\cdot\sin\theta + m_2(-a) = 0 \end{cases} \Rightarrow F_T = m_2\sqrt{g^2+a^2}$$

(2)



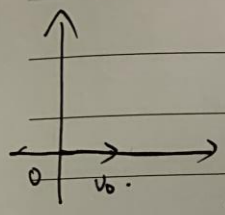
$$\begin{cases} m_1g - F_T - F_N = 0 \\ F_N\cdot\mu + m_1(-a) = 0 \end{cases} \Rightarrow \mu_{min} = \frac{m_1a}{m_1g - m_2\sqrt{g^2+a^2}}$$

70. 1-53

$\vec{v}_A = 7.5\vec{i} - 3\vec{j}$ (m/s)　　$\vec{v}_0 = 5\vec{i}$ (m/s)

$\vec{v}_C = 2\vec{i} + \frac{9}{2}\vec{j}$ (m/s)

$\vec{v}_B = v_{Bx}\vec{i} + v_{By}\vec{j}$ (m/s).

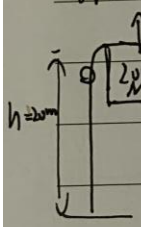


∴ $m_A\vec{v}_A + m_B\vec{v}_B + m_C\vec{v}_C = m\vec{v}_0$

⇒ $\vec{v}_B = 3.5\vec{i} + 1.5\vec{j}$ (m/s).

∴ $\vec{r}_B(2) = 7\vec{i} + 3\vec{j}$　　(7, 3) (m).

71. 1-55



$M \cdot v_1 - mv_2 = (m+M)v_0$

$v_2 \cdot t = h + v_1 \cdot t$

$t \le 10$

不一定匀速

⇒ $v_1 = 4$ m/s ↑　　$v_2 = 6$ m/s ↓

$\frac{(M+m)}{M+m} \cdot h + v_0 t$

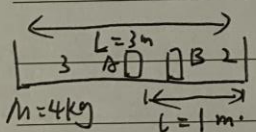
$= \frac{m\cdot 0 + M\cdot L}{M+m}$

⇒ $L = 50$ m　K50m.

~~∴ $t = h + v_1 \cdot t$~~

~~$= 60$ m~~

71. 1-56



~~$(M + m_A + m_B)v_0 = m_A v_A + m_B v_B$~~

以小车左端为 0. → 为 +.

$v_C = \frac{M\cdot\frac{L}{2} + (m_A+m_B)(L-L)}{M+m_A+m_B} = \frac{M(\frac{L}{2}+\frac{L}{2}) + m_A(S+L-L) + m_B(S+L)}{M+m_A+m_B}$

⇒ $S = \frac{4}{9}$ m (向右为 0)　~~$\frac{4}{9}$~~ $m_A \cdot \frac{4}{9}$ m.