105. 2-6

(1) $A_{外力} = \Delta E_k = -A_{弹}$

$A_{弹} = \int_{x_1}^{x_2} \vec{F}\, dx = (-26.4x^2 - 12.8x^3)\Big|_{x_1}^{x_2} = -69.2\text{J}$

$\therefore A_{外力} = 69.2\text{J}$

~~(2) 从 x=0 到 x=1m~~

~~① 直接拉. $A_{外力} = (26.4 + 12.8)$J~~

~~② 先拉到 x=0.5m, 再拉到 x=1m. $A_{外力} =$~~

(2) $A_{弹} = \int_{x_1}^{x_2} \vec{F}\, dx$, 若先到 x_3 $A'_{弹} = \int_{x_1}^{x_3} \vec{F}\, dx + \int_{x_3}^{x_2} \vec{F}\, dx$

$= \int_{x_1}^{x_2} \vec{F}\, dx = A_{弹}$

也是.

105. 2-7

$P = \vec{F} \cdot \vec{v}$, $\vec{F} = at\vec{i} + bt^2\vec{j}$ $\vec{F} = m\vec{a} \Rightarrow \vec{a} = \frac{at}{m}\vec{i} + \frac{bt^2}{m}\vec{j}$

$\vec{v} = \int \vec{a}\, dt = (\frac{at^2}{2m} + C_1)\vec{i} + (\frac{bt^3}{3m} + C_2)\vec{j}$ 又: $\vec{v}(0) = 0$

$\therefore \vec{v} = \frac{a}{2m}t^2\vec{i} + \frac{b}{3m}t^3\vec{j}$ $\therefore P = \frac{a^2}{2m}t^3 D + \frac{b^2}{3m}t^5$

105. 2-8

物体在 y 方向上的质心 x_y (以桌面为 $E_p = 0$).

$x_y = \frac{\frac{3}{4}m \cdot 0 + \frac{1}{4}m \cdot \frac{L}{8}}{m} = \frac{1}{32}L$

$\therefore A = mgx_y - mg \cdot 0 = \frac{1}{32}mgL$

105. 2-9

$0 - \frac{1}{2}mv_0^2 = \frac{1}{2}k\Delta x^2 + \frac{1}{2}kv^2 \Rightarrow \Delta x = \sqrt{\frac{m}{k}}v_0$, $\Delta l = \Delta x + \frac{mg}{k}$

$F = k \cdot \Delta x + mg = \sqrt{mk}\, v_0 + mg$

$= \sqrt{\frac{m}{k}}v_0 + \frac{m}{k}$

105. 2-10

(1) ~~AB之间压力记为F_N:~~

~~$F_N = m_B \cdot a_{AB}$~~ → 为+

~~$F_T - F_N = m_B a_B$~~

~~$a_{AB} = a_B$~~

$\frac{1}{2}kx_0^2 = \frac{1}{2}m_B v_B^2 + \frac{1}{2}m_B v_B^2 + \frac{1}{2}kx_1^2$

$v_A = v_B$ 在经过平衡位置后，$\vec{v}_A$向一，$\vec{a}_B$不可能向-

~~$F_T = kx_1$~~ ∴在平衡位置时分离，即 $x_1 = 0$

∴ $v_A = v_B = \sqrt{\frac{k}{m_A + m_B}}\, x_0$

(2) $\frac{1}{2}kx_1^2 = \frac{1}{2}m_A v_A^2 \Rightarrow x_1 = \sqrt{\frac{m_A}{m_A + m_B}}\, x_0$