

Version C

1. C
2. D

$$W_{gc} = f_c \Delta x = \mu_c mg \Delta x$$

$$= (0,2)(9,8 \text{ m/s}^2)(3 \text{ m}) \text{ m}$$

$$K_0 + U_0 = K + U + W_{fc}$$

$$\frac{1}{2} m v_0^2 = mgh + \mu_c mg \Delta x$$

$$v_0^2 = 2g(h + \mu_c \Delta x)$$

$$= 2(9,8 \text{ m/s}^2)(5 \text{ m} + 0,2(3 \text{ m}))$$

$h_0 = 0 \text{ m}$

$v_0 = 10,5 \text{ m/s}$



3. C (Vitesse initiale + aire sous la courbe = 10+16+8)
4. E

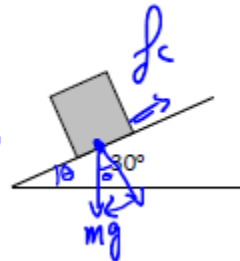
$$a_c = \frac{(2\pi r)^2}{T^2 r} = \frac{4\pi^2 r}{T^2} \Rightarrow 8 = \frac{a_{cA}}{a_{cB}} = \frac{r_A T_B^2}{r_B T_A^2} \Rightarrow \frac{r_A}{r_B} = 8 \left(\frac{T_A}{T_B}\right)^2 = 8 \left(\frac{1}{2}\right)^2 = 8 \left(\frac{1}{4}\right) = 2$$

5. C
- frottements
 frottement cinétique agissant sur un bloc de 3 kg
 vers le bas d'un plan incliné de 30 degrés.

Vitesse constante, $F_{net} = 0$

$$f_c = mg \sin \theta = (3 \text{ kg})(9,8 \text{ m/s}^2) \sin 30^\circ$$

$$= 14,7 \text{ N}$$



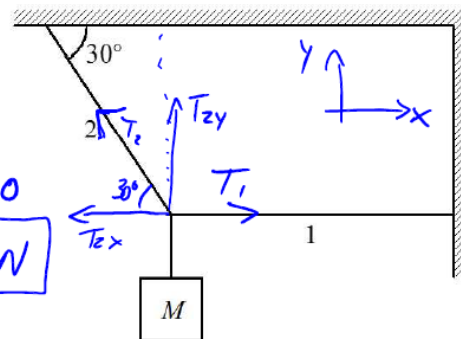
6. E
- suspendue par deux cordes tel qu'indiqué dans le schéma.
 La masse est de 2.0 kg, quelle est la tension (en Newton) de la corde 1?

$$\sum F_x = 0 \text{ (statique)} \quad \sum F_y = 0$$

$$T_1 - T_2 \cos 30^\circ = 0 \quad T_2 \sin 30^\circ - Mg = 0$$

$T_2 = 39,2 \text{ N}$

$$T_1 = 33,9 \text{ N}$$



7. D
8. B

$$v_y^2 = v_{y0}^2 + 2 a \Delta y$$

$$= 0 + 2 (9.8 \text{ m/s}^2) (-10 \text{ m}) \quad \uparrow$$

$$v_y = 14 \text{ m/s}$$

9. D

$$v_y^2 = v_{y0}^2 + 2 g \Delta y$$

$$0 = (15 \text{ m/s})^2 + 2 (-9.8 \text{ m/s}^2) \Delta y$$

Answers $\Delta y = 11,5 \text{ m}$

10. A

$$P_{\text{oids}} = m (9.8 - 2) \text{ m/s}^2$$

$$= 546 \text{ N}$$

11.



a) $N = 0$ → la vitesse minimum. (5)

b) $\sum F_y = -mg - N = -m a_c$ (4)

$$g = a_c = \frac{v^2}{R} \quad (3)$$

$$v = \sqrt{Rg} = \sqrt{(16 \text{ m}) (9.8 \text{ m/s}^2)}$$

$$v = 12,5 \text{ m/s} \quad (1)$$

c) $\Delta E = 0 = \Delta K + \Delta U$

$$K_i + U_i = K_f + U_f \quad (4)$$

$$0 + mgh_1 = \frac{1}{2} m v^2 + mg(2R) \quad (3)$$

$$h = \frac{\frac{1}{2} v^2 + 2gR}{g} = \frac{\frac{1}{2} (12,5 \text{ m/s})^2 + 2(9.8 \text{ m/s}^2)(16 \text{ m})}{9.8 \text{ m/s}^2}$$

$$h = 40,0 \text{ m}$$

12.

12. a)

$\sum F_{ix} = T - f_s = m_1 a = 0$ ($a=0$ since it's at rest) (5)
 $T = f_s = \mu_c N = \mu_c m_1 g$
 $\sum F_{iy} = N - m_1 g = 0$
 $N = m_1 g$
 $\sum F_{ix} = m_2 g - T = 0$
 $T = m_2 g$
 \Rightarrow dans (5)
 $T = \mu_c m_1 g$
 $m_2 g = \mu_c m_1 g$
 $m_2 = \mu_c m_1 = (0,1)(3\text{kg}) = 0,3\text{kg}$ (2)

b) $a_1 = a_2 = a$

$\sum F_{ix} = T - f_c = m_1 a$ (5)
 $T - \mu_c m_1 g = m_1 a$ (3)
 $\sum F_{2x} = m_2 g - T = m_2 a$ (4)
 $(3) + (4) \Rightarrow m_2 g - \mu_c m_1 g = (m_1 + m_2) a$ (2)
 $a = \frac{m_2 g - \mu_c m_1 g}{m_1 + m_2}$
 $= \frac{(8\text{kg})(9,8\text{m/s}^2) - (0,1)(3\text{kg})(9,8\text{m/s}^2)}{(3\text{kg} + 8\text{kg})}$
 $a = 6,86\text{m/s}^2$

c) $v_x^2 = v_{ix}^2 + 2a_x \Delta x$ (4)

$v_x = \sqrt{0 + 2(6,86\text{m/s}^2)(0,8\text{m})}$
 $v_x = 3,31\text{m/s}$ (3)