FÍSICA A

Aula 25

01. c

$E_c = E_p$

$E_c = m \cdot g \cdot h$

$E_c = 0{,}20 \cdot 10 \cdot (3{,}00 - 1{,}70)$

$E_c = 2{,}60\ J$

02. d

$\Delta E_c = E_c^2 - E_c^1$

$\Delta E_c = \frac{1}{2} \cdot m \cdot v_2^2 - \frac{1}{2} \cdot m \cdot v_1^2$

$\Delta E_c = \frac{1}{2} \cdot 4{,}00 \cdot 19{,}0^2 - \frac{1}{2} \cdot 4{,}00 \cdot 10{,}0^2$

$\Delta E_c = 522\ J$

03. 40 m/s

$\mathcal{A} = \Delta E_c$

área $\underline{\underline{N}}\ E_c^f - E_c^i$

$\left(\frac{30+10}{2}\right) \cdot 20 = \frac{1}{2} \cdot 0{,}5 \cdot v^2 - 0$

$v = 40\ m/s$

04. 58

02 + 08 + 16 + 32

05. a

$E_p = E_c$

$m \cdot g \cdot h = \frac{1}{2}\ mv^2$

$h = \frac{v^2}{2g}$

06. a

$E_c = E_p$

$\frac{1}{2}\ mv_0^2 = \frac{1}{2} \cdot k \cdot \Delta x^2$

$v_0^2 = \frac{k \cdot \Delta x^2}{m}$

$v^0 = \sqrt{\frac{k \cdot \Delta x^2}{m}} = \sqrt{\frac{k}{m}} \cdot \Delta x$

07. d

$\frac{1}{2}\ k \cdot x^2 = \frac{1}{2}\ mv^2$

$30 \cdot x^2 = 0{,}3 \cdot 2{,}0^2$

$x = 0{,}2\ m = 20\ cm$

08. b

$E_p = E_p$

$\frac{1}{2} \cdot K \cdot x^2 = m \cdot g \cdot h$

$\frac{1}{2} \cdot 200 \cdot x^2 = 0{,}4 \cdot 10 \cdot 10$

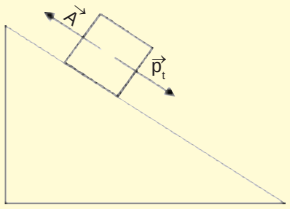
$x = 0{,}2\ m = 20\ cm$

09. e

10. d

I – falsa, pois há atrito

$v_{cte} \rightarrow \vec{R} = \vec{O}$



11. a

$I = \Delta Q$

$I = m \cdot v - m \cdot v_0$

$I = 0{,}4 \cdot O - 0{,}4 \cdot 10$

$I = -4\ N \cdot s$

$|I| = 4\ N \cdot s$

12. 45

01 + 04 + 08 + 32

13. e

14. b

$m_A \cdot v_A + m_B \cdot v_B = (m_A + m_B) \cdot v$

$m \cdot 10 + 3\ m \cdot 30 = (m + 3m) \cdot v$

$100\ m = 4\ m \cdot v$

$v = 25\ m/s$

15. a

$(m_A + m_B) \cdot v = m_A \cdot v_A + m_B \cdot v_B$

$m \cdot v = \frac{m}{2} \cdot \frac{v}{5} + \frac{m}{2} \cdot v_B$

$v = \frac{v}{10} + \frac{v_B}{2}$

$v - \frac{v}{10} = \frac{v_B}{2}$

$\frac{9v}{10} = \frac{v_B}{2}$

$v_B = \frac{9v}{5}$

Aula 26

01. 12

04 + 08

02. e

$p_0 = p_{ef} = \mu \cdot g \cdot h$

$10^5 = 10^3 \cdot 10 \cdot h$

$h = 10$ m

03. d

$p_{abs} = p_0 + p_{ef}$

$p^A_{abs} = 10^5 + 10^3 \cdot 10 \cdot 10 = 2 \cdot 10^5$ Pa = 2 atm

$p^B_{abs} = 10^5 + 10^3 \cdot 10 \cdot 15 = 2{,}5 \cdot 10^5$ Pa = 2,5 atm

$p^C_{abs} = 10^5 + 10^3 \cdot 10 \cdot 20 = 3 \cdot 10^5$ Pa = 3 atm

04. c

05. a

$p_1 = p_2 = p_3$ pois $h_1 = h_2 = h_3 = h$

e se: $p = \frac{F}{A}$ $\therefore$ $F = p \cdot A$

então $p_1 = p_3$

$$\frac{F_1}{A} = \frac{F_3}{2A}$$

$$F_1 = \frac{F_3}{2}$$

06. a)

$p_{abs} = p_0 + p_{ef}$

$p_{abs} = 1{,}0 \cdot 10^5 + 10^3 \cdot 10 \cdot 5$

$p_{abs} = 1{,}5 \cdot 10^5$ N/m^2

b)

Zero, pois $p_B = p_A$ (mesmo nível)

07. c

08. c

$\Delta p = p_{ext} - p_{int}$

$\Delta p = (p_0 + p_{ef}) - p_0$

$\Delta p = p_{ef} = \mu \cdot g \cdot h$

$\Delta p = 10^3 \cdot 10 \cdot 50$

$\Delta p = 5{,}0 \cdot 10^5$ Pa = 5 atm

09. b

$\Delta p = \mu \cdot g \cdot \Delta h$

$\Delta p = 1{,}02 \cdot 10^3 \cdot 9{,}8 \cdot (25 - 10)$

$\Delta p \cong 1{,}5 \cdot 10^5$ N/m^2

10. e

$p_{ef} = \mu \cdot g \cdot h$

$3 \cdot 10^3 = 0{,}75 \cdot 10^3 \cdot 10 \cdot h$

$h = 0{,}4$ m = 40 cm

11. b

$\Delta p = \mu \cdot g \cdot \Delta h$

$1{,}8 \cdot 10^4 = \mu \cdot 10 \cdot 2$

$\mu = 9{,}0 \cdot 10^2$ kg / m^3

12. b

Quanto maior a profundidade, maior a densidade do líquido (líquidos mais densos posicionam-se em profundidades maiores).

E, quanto mais denso é o líquido, maior a inclinação da reta no gráfico p × h.

13. 30

$p = p_0 + \mu_1 \cdot g \cdot h_1 + \mu_2 \cdot g \cdot h_2$

$1{,}038 \cdot 10^5 = 1{,}0 \cdot 10^5 + 0{,}8 \cdot 10^3 \cdot 10 \cdot 0{,}1 + 1{,}0 \cdot 10^3 \cdot 10 \cdot x$

$x = 0{,}3$ m = 30 cm

Aula 27

	0	1	2	3	4	5	6	7	8	9
0		c	b	a	39	a	04	c	a	c
1	d	b	d	e						

01. c
02. b
03. a
04. 39

01 + 02 + 04 + 32

16. falsa, pois:

$\mu_A \cdot h_A = \mu_B \cdot h_B$

$1 \cdot (10 - 8) = \mu_B \cdot 5$

$2 = \mu_B \cdot 5$

$\mu_B = 0{,}4$ g/cm^3

05. a

$\mu_1 \cdot h_1 = \mu_2 \cdot h_2$

$\mu_1 \cdot 10 = \mu_2 \cdot 20$

$\mu_2 = \frac{\mu_1}{2}$

06. 04

$\mu_A \cdot h_A = \mu_B \cdot h_B$

$5 \cdot 8 = \mu_B \cdot 10$

$\mu_B = 4$ g/cm^3

07. c

$13600 \cdot 0{,}5 = 1000 \cdot h$

$h = 6{,}8$ m

08. a

$\mu_1 \cdot h_1 = \mu_2 \cdot h_2$

$D_1 \cdot (15 - 12) = D_2 \cdot (20 - 12)$

$D_1 \cdot 3 = 1{,}5 \cdot 8$

$D_1 = 4$ g/cm^3

09. c

$p_G = p_0 + h$

$p_G = 76 + 38$

$p_G = 114$ cm Hg (: 76)

$p_G = 1{,}5$ atm

10. d

$p_G = p_0 + h$

$p = 750 + (170 - 20)$

$p = 900$ mm Hg

11. b

$p_G = p_0 + \mu \cdot g \cdot h$

$p_G = 10^5 + 13{,}6 \cdot 10^3 \cdot 10 \cdot 1$

$p_G = 2{,}36 \cdot 10^5$ Pa

12. d

$p_G = p_0 + \mu \cdot g \cdot h$

$p_G = 10^5 + 13{,}6 \cdot 10^3 \cdot 10 \cdot (0{,}25 - 0{,}05)$

$p_G = 1{,}272 \cdot 10^5$ Pa

13. e

$p_G = p_0 + \mu \cdot g \cdot h$

$p_G = p_0 + 1 \cdot 10^3 \cdot 10 \cdot 0{,}1$

$p_G = p_0 + 1 \cdot 10^3$

Logo: a pressão do gás excede em $1 \cdot 10^3$ N/m² a pressão atmosférica.

Testes complementares

	0	1	2	3	4	5	6	7	8	9
0		02	20	d	10	*	e	c	08	*
1	b									

01. 02

$F = k \cdot x$

$m \cdot g = k \cdot x$

$\therefore x = \frac{mg}{k}$

$E_p = E_p$

$m \cdot g \cdot x' = \frac{1}{2} \cdot k \cdot x'^2$

$x' = 2 \cdot \frac{mg}{k}$

Logo: $\frac{x'}{x} = 2$

02. 20

$\tau_R \overset{N}{=}$ área

$\tau_R = \tau_F + \tau_A$

$\tau_R = \frac{(40+20)}{2} \cdot 5 \cdot 40 + \left(-\frac{10.10}{2}\right)$

$\tau_R = 300$ J

E:

$\tau_R = \Delta E_c = E_c^f - E_c^i$

$\tau_R = \frac{1}{2} mv^2 - \frac{1}{2} mv_0^2$

$300 = \frac{1}{2} \cdot 1{,}5 \cdot v^2 - \frac{1}{2} \cdot 1{,}5 \cdot 0^2$

$\therefore v = 20$ m/s

03. d

+ Q ⟵ / ⟶ – Q

$\Delta Q = Q - (-Q)$

$\Delta Q = m \cdot v + m \cdot v_o$

$\Delta Q = 0{,}1 \cdot 20 + 0{,}1 \cdot 15$

$\Delta Q = 3{,}5$ kg · m/s

04. 10

$m_A \cdot v_A + m_B \cdot v_B = m_A \cdot v_A' \; m_B \cdot v_B'$

$2 \cdot 10 + 1 \cdot (-20) = 2 \cdot v_A' + 1 \cdot v_B'$

$2v_A' + v_B' = 0$ (1)

$e = \frac{v_A' - v_B'}{v_B - v_A}$

$0{,}5 = \frac{v_A' - v_B'}{-20 - 10}$

$v_A' - v_B' = -15$ (2)

Resolvendo o sistema por (1) e (2) chegamos a:

$v_B' = 10$ m/s

05. (I) V

$p_{ef} = \mu \cdot g \cdot h = 1{,}05 \cdot 10^3 \cdot 10 \cdot 1{,}20 = 12{,}6 \cdot 10^3$ N/m²

(II) F

$p_{ef} = \mu \cdot g \cdot h$

$332{,}23 = 1{,}05 \cdot 10^3 \cdot 10 \cdot h$

$h \cong 3{,}16 \cdot 10^{-2}$ m

Onde:

760 mm Hg — $1{,}01 \cdot 10^5$ N/m²

2,5 mm Hg — p_{ef}

$\therefore p_{ef} = 332{,}23$ N/m²

(III) F

$p_{ef} = \mu \cdot g_{\downarrow} \cdot h^{\uparrow}$

06. e

$p_{abs} = p_0 + p_{ef}$

$1{,}16 \cdot 10^5 = 1 \cdot 10^5 + \mu \cdot g \cdot h$

$0{,}16 \cdot 10^5 = \mu \cdot g \cdot 2{,}00$

$\mu \cdot g = 0{,}08 \cdot 10^5$

$\therefore p_{abs} = p_0 + p_{ef}$

$p_{abs} = 1 \cdot 10^5 + \mu \cdot g \cdot h$

$p_{abs} = 1 \cdot 10^5 + 0{,}08 \cdot 10^5 \cdot 13$

$p_{abs} = 2{,}04 \cdot 10^5$ Pa

07. c

08. 08

$\frac{\mu_B}{\mu_A} = \frac{h_A}{h_B}$

$\frac{\rho_0}{\rho_L} = \frac{h}{d}$

$\frac{8\rho_L}{\rho_L} = \frac{h}{d} \quad \therefore \quad \frac{h}{d} = 8$

09. a)

$p = \mu \cdot g \cdot h = 1 \cdot 10^3 \cdot 10 \cdot 0{,}4 = 0{,}4 \cdot 10^4$ N/m²

b)

$p = \mu \cdot g \cdot h = 1 \cdot 10^3 \cdot 10 \cdot (0{,}6 + 0{,}4 - 0{,}2 - 0{,}1)$

$= 0{,}7 \cdot 10^4$ N/m²

10. b)

$p_1 = p_2$

$\cancel{p_0} + \mu_c \cdot g \cdot h_c = \cancel{p_0} + \mu_B \cdot g \cdot h_B + \mu_A \cdot g \cdot h_A$

$\mu_c \cdot 2h = \mu_B \cdot 3h + \mu_A \cdot h$

$\mu_c = \frac{3\mu_B + \mu_A}{2}$

$\mu_c = \frac{3.1{,}0 + 0{,}80}{2}$ $\qquad \mu_c = 1{,}9$ g/cm³