FÍSICA B

Aula 13

	0	1	2	3	4	5	6	7	8	9
0		c	e	*	c	b	a	d	b	d
1	a	d	06	b	e					

01. c

$f = 3{,}6 \cdot 10^3 : 60 = 60\ \text{Hz} = 6 \cdot 10^1\ \text{Hz}$

02. e

$v = \frac{2\pi R}{T}\ \therefore\ T = \frac{2\pi R}{V}$

03.

$f = \frac{1200}{\pi}\ \text{rpm} = \frac{20}{\pi}\ \text{Hz}$

$w = 2\pi f = 2\pi \cdot \frac{20}{\pi} = 40\ \text{rad/s}$

04. c

$f = 3\,000\ \text{rpm} = 50\ \text{Hz}$

$V = 2\pi r f = 2 \cdot 3{,}14 \cdot 0{,}1 \cdot 50 = 31{,}4\ \text{m/s}$

05. b

$T = 4 \cdot 5 = 20\text{s}$

$f = \frac{1}{T} = \frac{1}{20} = 0{,}05\ \text{Hz}$

$w = 2\pi f = 2\pi \cdot 0{,}05 = 0{,}1p = \frac{\pi}{10}\ \text{rad/s}$

06. a

07. d

08. b

09. d

$f_A = 300\ \text{rpm} = 5\ \text{Hz}$

$r_A \cdot f_A = r_B \cdot f_B$

$10 \cdot 5 = 40 \cdot f_B$

$f_B = 1{,}25\ \text{Hz}$

$\therefore\ TB = \frac{1}{f_B} = \frac{1}{1{,}25} = 0{,}8\ \text{s}$

$v_B = 2\pi \cdot r_B \cdot f_B = 2\pi \cdot 0{,}41 \cdot 1{,}25 = \pi\ \text{m/s}$

10. a

$v = 2\pi r f$

11. d

$v = 2\pi r f = \frac{2\pi r}{T} = \frac{2\pi \cdot 6\,000}{24} \cong 1\,570\ \text{km/h}$

12.

$$\frac{a_C^A}{a_C^B} = \frac{\frac{v_A^2}{r_A}}{\frac{v_B^2}{r_B}} = \frac{v_A^2 \cdot r_B}{v_B^2 \cdot r_A} = \frac{30^2 \cdot 10}{10^2 \cdot 15} = 6$$

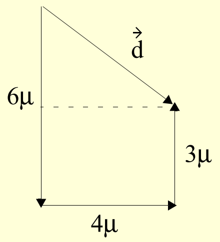
13. b

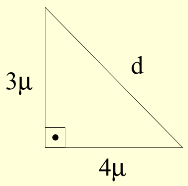
14. e

Aula 14

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

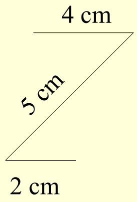
01. b





$\therefore\ d = 5\mu$

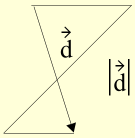
02. b



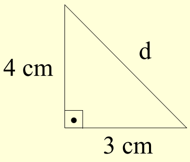
$\Delta x = 4 + 5 + 2 = 11\ \text{cm}$

$V = \frac{\Delta x}{\Delta t} = \frac{11}{2} = 5{,}5\ \text{cm/s}$

03. d



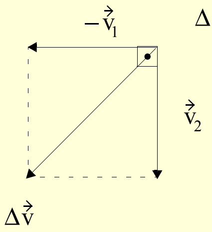
$|\vec{d}| = 5\ \text{cm}$



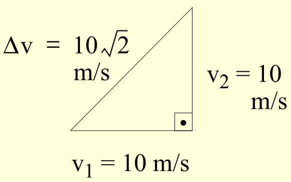
$\therefore\ V = \frac{d}{\Delta t} = \frac{5}{2} = 2{,}5\ \text{cm/s}$

04. e

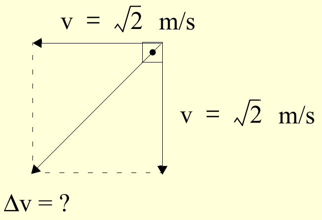
05. e



$\Delta\vec{v} = \vec{v}_2 - \vec{v}_1$



06. b



$$\Delta v^2 = (\sqrt{2})^2 + (\sqrt{2})^2$$

$\therefore \quad \Delta v = 2$ m/s

$$a = \frac{\Delta v}{\Delta t} = \frac{2}{1} = 2 \text{ m/s}^2$$

07. a

M.C.A.

08. d

M.C.R.

09. a

M.C.U.

10. d

M.C.R.

11. d

$\vec{v}$: tangente à curva

$\vec{a}$: para dentro da curva

12. e

13. d

14. c

15. a

M.C.U. $\therefore \quad a = a_C = \frac{v^2}{r} = \frac{100^2}{10} = 1\,000 \text{ m/s}^2$

16. a

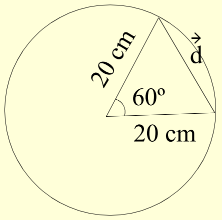
retilíneo: $a_N = a_C = 0$

aceleração: $a_T \neq 0$ e no mesmo sentido da velocidade.

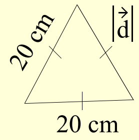
17. e

- $a_T = 1 \text{m/s}^2$
- $a_C = \frac{v^2}{r} = \frac{10}{100}$; onde $v = v_0 + a \cdot t$
  $v = 0 + 1 \cdot 10$
  $v = 10$ m/s
- $a_C = 1 \text{m/s}^2$

18. c



$$\frac{360°}{6} = 60° \Rightarrow \text{triângulo equilátero}$$



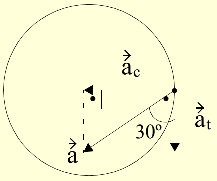
$|\vec{d}| = 20\text{cm}$

$$v = \frac{|\vec{d}|}{\Delta t} = \frac{20}{8} = 2,5 \text{ cm/s}$$

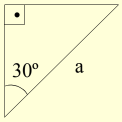
19. a. 12 m/s^2

b. Acelerado, pois a componente tangencial da aceleração tem o mesmo sentido de $\vec{v}$.

a. $a_c = \frac{v^2}{r} = \frac{3^2}{1,5} = 6 \text{ m/s}^2$



$a_C = 6 \text{ m/s}^2$



$$\text{sen } 30° = \frac{6}{a}$$

$$\frac{1}{2} = \frac{6}{a}$$

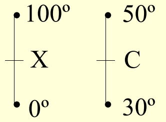
$a = 12 \text{ m/s}^2$

Aula 15

	0	1	2	3	4	5	6	7	8	9
0		c	d	e	a	d	31	a	a	c
1	*	b	a							

01. c

Construindo as escalas termométricas, temos:



$$\frac{t_X - 0}{100 - 0} = \frac{t_C - 30}{50 - 30}$$

$$\frac{t_X}{\cancel{100}_5} = \frac{t_C - 30}{\cancel{20}_1} \quad \therefore$$

$$\therefore \quad \boxed{\frac{t_X}{5} = t_C - 30}$$

fusão do gelo (0º C)

$\frac{t_X}{5} = 0 - 30$

$t_X = -150º$

ebulição da água (100º C)

$\frac{t_X}{5} = 100 - 30$

$t_X = +350º$

02. d

$$\frac{t_C}{5} = \frac{t_F - 32}{9}$$

$$\frac{70}{5} = \frac{t_F - 32}{9} \quad \therefore \quad 5\,(t_F - 32) = 9 \cdot 70 \quad \therefore$$

$$\therefore \quad \boxed{t_F = 158^\circ\ F}$$

03. e

$$\boxed{t_F = 5t_C}$$

$$\frac{t_C}{5} = \frac{t_F - 32}{9}$$

$$\frac{t_C}{5} = \frac{5t_C - 32}{9} \quad \therefore \quad 25t_C - 160 = 9t_C \quad \therefore$$

$$\therefore \quad 25t_C - 9t_C = 160$$

$$\boxed{t_C = 10^\circ C}$$

04. a

$$\frac{\Delta t_C}{5} = \frac{\Delta t_F}{9}$$

$$\frac{60}{5} = \frac{\Delta t_F}{9} \quad \therefore \quad \boxed{\Delta t_F = 108^\circ F}$$

05. d

$$\boxed{t_K = t_F + 145}$$

$$\frac{t_K - 273}{5} = \frac{t_F - 32}{9}$$

$$\frac{t_F + 145 - 273}{5} = \frac{t_F - 32}{9}$$

$$\frac{t_F - 128}{5} = \frac{t_F - 32}{9}$$

$$5\,(t_F - 32) = 9\,(t_F - 128)$$

$$5t_F - 160 = 9t_F - 1\,152$$

$$\boxed{t_F = 248^\circ}$$

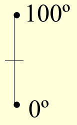
$$\frac{t_F - 32}{9} = \frac{t_C}{5}$$

$$\frac{248 - 32}{9} = \frac{t_C}{5}$$

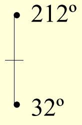
$$\boxed{t_C = 120^\circ}$$

06. 31

01. escala Celsius

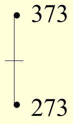


02. escala Fahrenheit



04. $\frac{\Delta t_C}{100^\circ} = \frac{\Delta t_F}{180^\circ}$

08. escala Kelvin

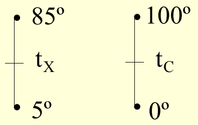


16. $\frac{t_C}{5} = \frac{t_F - 32}{9}$

$$\frac{6\,000}{5} = \frac{t_F - 32}{9}$$

$$\boxed{t_F = 10\,832^\circ}$$

07. a



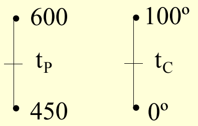
$$\frac{t_X - 5}{85 - 5} = \frac{t_C - 0}{100 - 0}$$

$$\frac{t_C}{\cancel{100}} = \frac{t_X - 5}{\cancel{80}} \quad \therefore$$

$$\therefore \quad \frac{t_C}{5} = \frac{t_X - 5}{4}$$

$$\boxed{t_C = \frac{5X - 25}{4}}$$

08. a

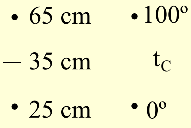


$$\frac{P - 450}{600 - 450} = \frac{C - 0}{100 - 0}$$

$$\frac{P - 450}{{}_3\cancel{150}} = \frac{C}{\cancel{100}_2} \quad \therefore$$

$$\therefore \quad \boxed{C = \frac{2(p - 450)}{3}}$$

09. c

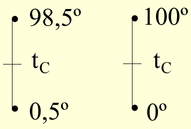


$$\frac{t_C - 0}{100 - 0} = \frac{35 - 25}{65 - 25}$$

$$\frac{t_C}{\underset{2,5}{\cancel{100}}} = \frac{10}{\cancel{40}_{1}}$$

$$\boxed{t_C = 25°C}$$

10.



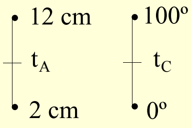
$$\frac{t_C - 450}{98,5 - 0,5} = \frac{t_C - 0}{100 - 0}$$

$$\frac{t_C - 0,5}{98} = \frac{t_C}{100}$$

$$98t_C = 100t_C - 50 \quad \therefore$$

$$\therefore \quad \boxed{t_C = 25º\ C}$$

11. b



$$\frac{t_A - 2}{12 - 2} = \frac{t_C - 0}{100 - 0}$$

$$\frac{t_A - 2}{10} = \frac{t_C}{100}$$

$$\boxed{t_A - 2 = \frac{t_C}{10}}$$

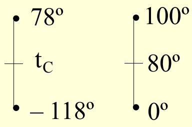
menor temperatura:

$\boxed{t_A = 0\ \text{cm}}$

$0 - 2 = \frac{t_C}{10}$

$\boxed{t_C = -20°C}$

12. a



$$\frac{t_C - (-118)}{78 - (-118)} = \frac{80 - 0}{100 - 0}$$

$$\frac{t_C + 118}{196} = \frac{80}{100}$$

$$\boxed{t_C = 38,8°C}$$

Aula 16

	0	1	2	3	4	5	6	7	8	9
0		11	a	c	c	a	c	d	b	d
1	53	a	c							

01. 01. A unidade de coeficiente pode ser $°C^{-1}$ (não altera metros ou centímetros).

02. $\boxed{\gamma = 3\alpha}$

08. Para °C ou K mesmo coeficiente, pois $\boxed{\Delta T_C = \Delta T_K}$

02. a

$\frac{30\ \text{cm}}{25\ \text{cm}} = \frac{120\ \text{cm}}{\text{parede}} \therefore = 100\ \text{cm}$

$\Delta L = L_0 \cdot \alpha \cdot \Delta t$

$0,2\ \text{cm} = 100\ \text{cm} \cdot a \cdot 100\ °C \therefore \boxed{\alpha = 2 \cdot 10^{-5}\ °C^{-1}}$

03. c

$\boxed{\beta_{metal} > \beta_{vidro}}$

04. c

Como L_0 da barra M é maior e o ΔL das duas barras é o mesmo, a barra M possui um coeficiente de dilatação menor.

05. a

$\Delta L = L_0 \cdot \alpha \cdot \Delta t$

$(50,1 - 50) = 50 \cdot \alpha \cdot 100$

$\boxed{\alpha = 2 \cdot 10^{-5}\ °C^{-1}}$

06. c

$\Delta L = L_0 \cdot \alpha \cdot \Delta t$

$0,006 = 10 \cdot \alpha \cdot 30$

$\boxed{\alpha = 2 \cdot 10^{-5}\ °C^{-1}}$

07. d

Como a folga é bem maior que o pino, sofrerá uma maior dilatação.

08. b

Temperatura aumenta de 0 °C para 4 °C.

Volume diminui de 0 °C para 4 °C, então a massa específica aumenta.

09. d

$\boxed{\Delta S_A = \Delta S_d}$

$\pi \cdot R_A^2 \cdot \beta_A \cdot \Delta t = \pi \cdot R_d^2 \cdot \Delta t \cdot \beta_d$

$$\boxed{\frac{R_A^2}{R_d^2} = \frac{\alpha_d}{\alpha_A}}$$

10. $L_{0\,\text{latão}} < L_{0\,\text{aço}}$

$\alpha_{\text{latão}} < \alpha_{\text{aço}}$

Para encaixe, precisamos aquecê-los

Para encaixe, resfriamos apenas o cilindro.

O anel, soltará para grande aquecimento.

Aquece o anel e promove o encaixe.

11. a

$\alpha_{\text{vasilha}} = \gamma_{\text{líquido}}$ – Proporcionalmente, a vasilha dilata mais que o líquido.

12. c

$\Delta V = V_0 \cdot \gamma \cdot \Delta t$

$\Delta V = 8 \cdot 3 \cdot 12 \cdot 10^{-6} \cdot 900$

$\Delta V = 0{,}2592 \ \text{cm}^3$

– **novo volume** → 8,2592 cm^3

8 cm^3 – 100%

8,2592 cm^3 – x

x = 103,24 %

aumentou 3,24 %

Testes complementares

	0	1	2	3	4	5	6	7	8	9
0		d	a	a	a	d	e	a	d	a
1	a									

01. d

$v_A = v_B$

$\Omega_A \cdot R_A = \Omega_B \cdot R_B$

$\Omega_A \cdot 0{,}3 = \Omega_B \cdot 0{,}6$

$\Omega_A = 2 \cdot \Omega$

02. a

I. Correta – $f = \frac{50}{25} = 2\text{Hz}$

$T = \frac{1}{f} = \frac{1}{2} = 0{,}5\text{s}$

II. Falsa – $T = 4 + 4 = 8\text{s}$

$f = \frac{1}{8} = 0{,}125\text{s}$

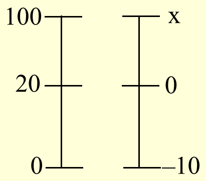
III. Falsa – Tem aceleração centrípeda.

03. a

Como a velocidade escalar é constante, a aceleração centrípeda também tem módulo constante.

04. a

05. d



$$\frac{x-(-10)}{0-(\ 10)} = \frac{100-0}{20-0}$$

$$\frac{x+10}{10} = \frac{100}{20}$$

$$x = 40°X$$

06. e

$\Delta L = \alpha \cdot Lo \cdot \Delta t$

$3 = \alpha \cdot 6\,000 \cdot (68 - 18)$

$\alpha = 10 \cdot 10^{-6} °C^{-1}$

07. a

08. d

A dilatação linear é a mesma para corpos de mesmo material e mesmo comprimento, quando submetidos à mesma variação de temperatura.

09. a

$\Delta L = \alpha \cdot Lo \cdot \Delta t$

$\Delta L = 11 \cdot 10^{-6} \cdot 80 \cdot (120 - 20)$

$\Delta L = 0{,}088\text{cm}$

10. a

Como há diminuição de densidade, quando a substância A tem sua temperatura reduzida de 4°C para 0°C, há também aumento de volume, provocando o rompimento da garrafa A.

Anotações