Sistema de Ensino Energia

Resolução da Prova do Vestibular

UDESC

Ciências da Computação

01) Números naturais múltiplos de 4 entre 150 e 1000:
(152, 156, 160, ..., 996)

a) $a_n = a_1 + (n - 1) . r$
$996 = 152 + (n - 1) . 4$
$n = 212$ números serão exibidos na tela do computador.

b) $S_n = \dfrac{(a_1 + a_n) . n}{2}$

$S_{212} = \dfrac{(152 + 996) . 212}{2}$

$S_{212} = 121688$

Soma = 121688

02) Usaremos o Princípio Fundamental da Contagem.

Número de senhas com 6 caracteres:

$\boxed{K}\ \boxed{V}\ \boxed{V}\ \boxed{A}\ \boxed{A}\ \boxed{A}$

$1 \times 5 \times 4 \times 10 \times 10 \times 10 = 20000$

Número de senhas com 7 caracteres:

$\boxed{K}\ \boxed{V}\ \boxed{V}\ \boxed{A}\ \boxed{A}\ \boxed{A}\ \boxed{A}$

$1 \times 5 \times 4 \times 10 \times 10 \times 10 \times 10 = 200000$

Número de senhas com 8 caracteres:

$\boxed{K}\ \boxed{V}\ \boxed{V}\ \boxed{A}\ \boxed{A}\ \boxed{A}\ \boxed{A}\ \boxed{A}$

$1 \times 5 \times 4 \times 10 \times 10 \times 10 \times 10 \times 10 = 2000000$

Total de senhas que satisfazem as exigências de Keli:
20000 + 200000 + 2000000 = 2220000 senhas

03)
$$\begin{array}{l} \textcircled{1} \\ \textcircled{2} \\ \textcircled{3} \end{array} \begin{cases} x + y + z = 0 \\ 2x - y - 2z = 5 \\ 5x + 4y + 3z = 1 \end{cases}$$

$$\begin{array}{l} -2\ \textcircled{1} + \textcircled{2} \Rightarrow \\ -5\ \textcircled{1} + \textcircled{3} \end{array} \quad \begin{cases} -3y - 4z = 5 \\ \underline{-y - 2z = 1 \quad (-2)} \end{cases}$$

$$+ \begin{cases} -3y - 4z = 5 \\ \underline{2y + 4z = -2} \end{cases}$$

$$-y = 3$$
$$y = -3$$

$-y - 2z = 1$
$-(-3) - 2z = 1$
$-3 - 2z = 1$
$-2z = 1 + 3$
$z = -2$

$x + y + z = 0 \Rightarrow x - 3 - 2 = 0$
$x = 5$

$$\begin{array}{l} \textcircled{1} \\ \textcircled{2} \\ \textcircled{3} \end{array} \begin{cases} x + y + z = 0 \\ 2x - y - 2z = 5 \\ 5x + 4y + 3z = 1 \end{cases}$$

$$\begin{array}{l} -2\ \textcircled{1} + \textcircled{2} \Rightarrow \\ -5\ \textcircled{1} + \textcircled{3} \end{array} \quad \begin{cases} -3y - 4z = 5 \\ \underline{-y - 2z = 1 \quad (-2)} \end{cases}$$

$$+ \begin{cases} -3y - 4z = 5 \\ \underline{2y + 4z = -2} \end{cases}$$

$$-y = 3$$

$$y = -3$$

$-y - 2z = 1$

$3 - 2z = 1$

$-2z = 1 - 3$

$z = 1$

$x + y + z = 0$

$x - 3 + 1 = 0$

$x = 2$

$S = \{(2, -3, 1)\}$

$$\begin{vmatrix} 2z & -y & -x-y \\ x-2z & z & y+3z \\ x-y & 3z & x-z \end{vmatrix} = \begin{array}{|ccc|} 2 & 3 & 1 \\ 0 & 1 & 0 \\ 5 & 3 & 1 \\ \hline 2 & 3 & 1 \\ 0 & 1 & 0 \end{array} = 2 - 5 = -3$$

04) a) $A \overset{N}{=} \tau_F$

$$\tau_F = \frac{4 \,.\, 40}{2}$$

$$\tau_F = 80 \text{ J}$$

b) $A \overset{N}{=} \tau_F$

$$\tau_F = \frac{4 \,.\, 40}{2} + 1 \,.\, 40 + \frac{1 \,.\, 40}{2} + \frac{1 \,.\, (-40)}{2} + 1 \,.\, (-40) + \frac{1(-40)}{2}$$

$$\tau_F = 60 \text{ J}$$

c) $\tau_{FR} = \Delta E_c$

$$\tau_{FR} = \frac{mv^2}{2} - \cancel{\frac{mv_0^2}{2}}$$

$$120 = \frac{1{,}2 \,.\, v^2}{2}$$

$$v^2 = 200$$

$$v = 10\sqrt{2} \text{ m/s}$$

05) a) $Q = Q_{S_G} + Q_{L_G} + Q_{S_A} + Q_{L_A}$

$Q = m \,.\, c_G \,.\, \Delta T_G + mL_F + m \,.\, c_A \,.\, \Delta T_A + mL_V$

$Q = 100 \,.\, 0{,}55 \,.\, (0 - (-5)) + 100 \,.\, 80 + 100 \,.\, 1 \,.\, (100 - 0) + 100 \,.\, 540$

$Q = 275 + 8000 + 10000 + 54000$

$Q = 72275$ cal

b) $Q_F + Q_A = 0$

$m_F \,.\, c_P \,.\, \Delta T_F + m_A \,.\, c_A \,.\, \Delta T_A = 0$

$20 \,.\, 0{,}11 \,.\, (T - 500) + 100 \,.\, 1 \,.\, (T - 20) = 0$

$2{,}2T - 1100 + 100T - 2000 = 0$

$102T = 3300$

$$T = \frac{3300}{102}$$

$T = 32{,}35$ °C

c) Gelo

$Q = m \,.\, L$

$Q = 10 \,.\, 80$

$Q = 800$ cal

Álcool (sólido)

$Q = m \,.\, L$

$Q = 10 \,.\, 25$

$Q = 250$ cal

Mercúrio (sólido)

$Q = m \,.\, L$

$Q = 10 \,.\, 2{,}8$

$Q = 28$ cal

Nitrogênio (sólido)

$Q = m \,.\, L$

$Q = 10 \,.\, 6{,}1$

$Q = 61$ cal

Prata

$Q = m \,.\, L$

$Q = 10 \,.\, 21$

$Q = 210$ cal

Chumbo

$Q = m \,.\, L$

$Q = 10 \,.\, 5{,}8$

$Q = 58$ cal

Ferro

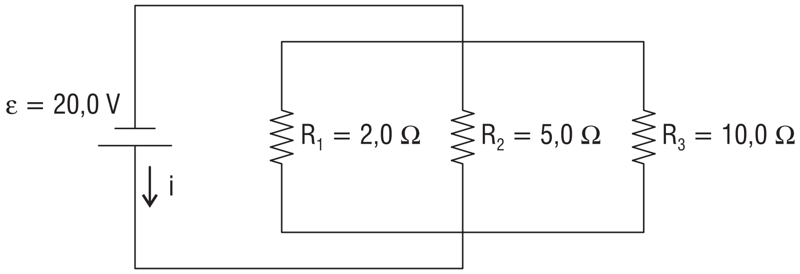
$Q = m \,.\, L$

$Q = 10 \,.\, 64$

$Q = 640$ cal

As substâncias totalmente fundidas são: mercúrio, nitrogênio e chumbo, pois as 100 calorias fornecidas são maiores do que a quantidade de calor necessária para fundi-las

06)



a) $\frac{1}{R_{EQ}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$

$\frac{1}{R_{EQ}} = \frac{1}{2,0} + \frac{1}{5,0} + \frac{1}{10,0}$

$\frac{1}{R_{EQ}} = \frac{8,0}{10,0}$

$R_{EQ} = \frac{10,0}{8,0}\ \Omega$

$i = \frac{\varepsilon}{R_{EQ}}$

$i = \frac{20,0}{\frac{10,0}{8,0}}$

$i = 16$ A

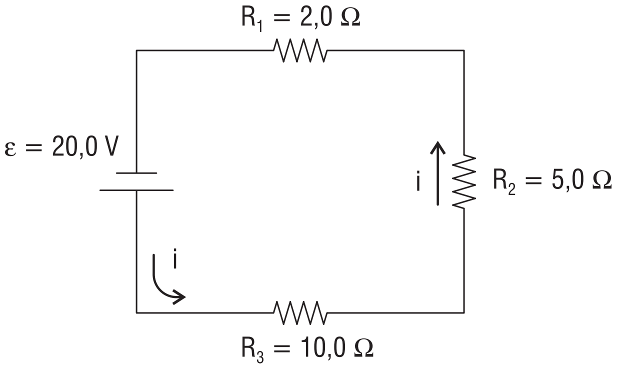
b) $P_{R_2} = \frac{\varepsilon^2}{R_2}$

$P_{R_2} = \frac{(20,0)^2}{5,0} \Rightarrow P_{R_2} = 80$ W

$P_{R_3} = \frac{\varepsilon^2}{R_3}$

$P_{R_3} = \frac{(20,0)^2}{10} \Rightarrow P_{R_3} = 40$ W

c)



$R_{EQ} = R_1 + R_2 + R_3$
$R_{EQ} = 17,0\ \Omega$

$i = \frac{\varepsilon}{R_{EQ}}$

$i = \frac{20,0}{17,0}$

$i = 1,18$ A

$P_2 = R_2 \cdot I^2$
$P_2 = 5,0 \cdot (1,18)^2$
$P_2 = 6,96$ W