FÍSICA

21   Letra E.

$Q_S = m \cdot c \cdot \Delta T \rightarrow$ quanto maior a variação de temperatura, mantendo-se a massa e a quantidade de calor inalteradas, menor será o calor específico.

22   Letra D.

Como 2 cubos de gelo foram capazes de variar a temperatura da água de 24ºC, quando utilizarmos os 4 cubos, teremos tanto água quanto gelo a 0ºC, já que a quantidade de gelo mencionada não se fundirá por completa.

23   Letra B.

$P = \dfrac{Q}{\Delta t} \rightarrow 400 = \dfrac{Q}{10} \therefore Q = 4000cal$

$Q_S = m \cdot c \cdot \Delta T \rightarrow 4000 = 100 \cdot c \cdot 80 \therefore c = 0,5cal/g^\circ C$

24   Letra D.

$P_{disponível} = 420 \cdot 0,8 = 336W$

$Q_S = m \cdot c \cdot \Delta T = 2000 \cdot 1 \cdot 80 = 160000cal = 672000J$

$P = \dfrac{Q}{\Delta t} \rightarrow 336 = \dfrac{672000}{\Delta t} \therefore \Delta t = 2000s$

25   Letra D.

$\left. \begin{array}{l} Q_A = m_A \cdot c_A \cdot (30 - 10) = 20m_A c_A \\ Q_B = m_B \cdot c_B \cdot (30 - 60) = -30m_B c_B \end{array} \right\} \Sigma Q_{trocados} = 0 \therefore 20m_A c_A - 30m_B c_B = 0$

$m_A = m_B \therefore \dfrac{c_A}{c_B} = 1,5$

26   Letra D.

$\Delta T_{A-0-10s} = 40 - 20 = 20^\circ C$

$P = \dfrac{Q}{\Delta t} \therefore 10 = \dfrac{Q}{10} \rightarrow Q = 100cal$

$C = \dfrac{Q}{\Delta T} = \dfrac{100}{20} = 5cal/^\circ C$

27   Letra D.

$\left. \begin{array}{l} Q_L = m \cdot L = 100 \cdot 80 = 8000cal \\ Q_S = m \cdot c \cdot \Delta T = 100 \cdot 1 \cdot 20 = 2000cal \end{array} \right\} Q_{fornecido} = 10000cal$

28   Letra E.

$\left. \begin{array}{l} Q_{vapor} = m \cdot L = m \cdot 540 = 540mcal \\ Q_{gelo} = m \cdot L = m \cdot 80 = 80mcal \end{array} \right\}$ Impossível ter apenas vapor

d'água a 100ºC.

29   Letra A.

$Q_L = m \cdot L = 40 \cdot 80 = 3200\text{cal}$

$C = \dfrac{Q}{\Delta T} = \dfrac{3200}{100} = 32\text{cal/}°C$

30   Letra A.

$Q_{\text{sólido}} = 700 - 500 = 200\text{cal}$

$Q_S = m \cdot c \cdot \Delta T \rightarrow 200 = 5 \cdot c \cdot 200 \therefore c = 0,2\text{cal/g}°C$

31   Letra A.

$\Delta S = 2 \cdot \pi \cdot R = 2 \cdot 3,14 \cdot 6400 \cong 40192\text{km}$

$\Delta t = 24\text{h}$

$V = \dfrac{\Delta S}{\Delta t} = \dfrac{40192}{24} \cong 1700\text{km/h}$

32   Letra B.

$V = 72\text{km/h} = 20\text{m/s}$

$V = \dfrac{\Delta S}{\Delta t} \therefore 20 = \dfrac{\Delta S}{10} \rightarrow \Delta S = 200\text{m}$

$d_{\text{túnel}} = 200 - 50 = 150\text{m}$

33   Letra A.

$V_{\text{moto}} = 72\text{km/h} = 20\text{m/s}$

$V_{\text{trem}} = 54\text{km/h} = 15\text{m/s}$

$S = S_0 + v \cdot t \rightarrow S_{\text{moto}} = 0 + 20 \cdot t = 20 \cdot t$

$S_{\text{trem}} = 100 + 15 \cdot t$

$S_{\text{trem}20 \cdot t} = S_{\text{moto}} \therefore 20 \cdot t = 100 + 15 \cdot t \rightarrow t = 20s$

$V = \dfrac{\Delta S}{\Delta t} \rightarrow 20 = \dfrac{\Delta S}{20} \therefore \Delta S_{\text{moto}} = 400\text{m}$

34   Letra B.

$V_1 = \dfrac{\Delta S}{\Delta t} = \dfrac{20}{10} = 2\text{km/min}$

$V_2 = \dfrac{\Delta S}{\Delta t} = \dfrac{25}{12} \cong 2,08\text{km/min}$

$V_3 = \dfrac{\Delta S}{\Delta t} = \dfrac{12}{18} \cong 0,66\text{km/min}$ Motorista 2

$V_4 = \dfrac{\Delta S}{\Delta t} = \dfrac{22}{20} = 1,1\text{km/min}$

$V_5 = \dfrac{\Delta S}{\Delta t} = \dfrac{25}{30} \cong 0,83\text{km/min}$

35   Letra D.

$V = \dfrac{\Delta S}{\Delta t} \rightarrow 30 = \dfrac{10}{\Delta t} \therefore \Delta t = \dfrac{1}{3}\text{h} = 20\text{min} \Rightarrow 11\text{h}20\text{min}$

36   Letra D.

$\Delta T_{A-0-10s} = 40 - 20 = 20°C$

$P = \dfrac{Q}{\Delta t} \therefore 10 = \dfrac{Q}{10} \to Q = 100\,cal$

$C = \dfrac{Q}{\Delta T} = \dfrac{100}{20} = 5\,cal/°C$

37 **Letra A.**

$V = \dfrac{\Delta S}{\Delta t} \to 1,5 = \dfrac{3000}{\Delta t_1} \therefore \Delta t_1 = 2000s$

$V = \dfrac{\Delta S}{\Delta t} \to 2 = \dfrac{2000}{\Delta t_2} \therefore \Delta t_2 = 1000s$

$\left.\right\} \Delta t_{total} = 3000s$

$\Delta S_{total} = 5000m \to V = \dfrac{\Delta S}{\Delta t} = \dfrac{5000}{3000} \cong 1,667\,m/s$

38 **Letra B.**

$IDA \to V_R = \dfrac{\Delta S}{\Delta t} \therefore V_{barco} - V_{rio} = \dfrac{d_{AB}}{30} \therefore 10 - V_{rio} = \dfrac{d_{AB}}{30} \to V_{rio} = 10 - \dfrac{d_{AB}}{30}$

$VOLTA \to V_R = \dfrac{\Delta S}{\Delta t} \therefore V_{barco} + V_{rio} = \dfrac{d_{AB}}{15} \therefore 10 + 10 - \dfrac{d_{AB}}{30} = \dfrac{d_{AB}}{15} \to d_{AB} = 200m$

39 **Letra B.**

$S_{líder} = 0 + 3 \cdot t = 3 \cdot t$

$S_{retardatário} = S_0 + 2 \cdot t$

$1° \text{ volta}: S_{líder} = S_{retardatário} \to 3 \cdot t = S_0 + 2 \cdot t \therefore t = S_0$

$\Rightarrow S_{líder} = 3 \cdot S_0 \therefore 3° \text{ volta}$

40 **Letra B.**

$V = \dfrac{\Delta S}{\Delta t} \to 30 = \dfrac{\frac{d}{2}}{t_1} \therefore t_1 = \dfrac{d}{60}h$

$V = \dfrac{\Delta S}{\Delta t} \to 10 = \dfrac{\frac{d}{2}}{t_2} \therefore t_2 = \dfrac{d}{20}h$

$\left.\right\} t_{total} = \dfrac{d}{15}h$

$V = \dfrac{d}{\frac{d}{15}} = 15\,km/h$