

$$\Delta U = Q + W$$

Isokhorik  
 $\Delta U_{AB} = Q_{AB}$   
 $W = 0$

$$PV = nRT$$

$$T = \frac{PV}{nR}$$

$$= n C_V \Delta T$$

$$= n \frac{3}{2} R \left( \frac{PV}{nR} \right)$$

$$= \frac{3}{2} (1-2) 10^5 \cdot 4 \cdot 10^{-3}$$

$$= -6000 \text{ J}$$

= isobar

$$\Delta U_{BCD} = Q_{BCD} + W_{BCD}$$

$$= n C_P \Delta T \left( \frac{P \Delta V}{nR} \right) - P \Delta V$$

$$= n \frac{5}{2} R \left( \frac{P \Delta V}{nR} \right) - P \Delta V$$

$$= \frac{5}{2} P \Delta V - P \Delta V$$

$$= \frac{3}{2} P \Delta V$$

$$= \frac{3}{2} \cdot 10^5 \cdot (16-4) \cdot 10^{-3}$$

$$= \frac{3}{2} \cdot 10^5 \cdot 12 \cdot 10^{-3}$$

$$= 18000 \text{ J}$$

$$\Delta U_{\text{total}} = \Delta U_{AB} + \Delta U_{BCD}$$

$$= -6000 + 18000$$

$$= 12000$$

$$W_{\text{total}} = W_A + W_{BCD}$$

$$= 0 + (-P \Delta V)$$

$$= -10^5 \cdot (16-4) \cdot 10^{-3}$$

$$= -12000$$

$$Q_{\text{total}} = \Delta U_{\text{total}} - W_{\text{total}}$$

$$= 12000 - (-12000)$$

$$= 24000 \text{ J}$$

5 a. jumlah gelombang:  
 $n = 1,5$  gelombang

b.  $A = 2 \text{ cm} = 0,02 \text{ m}$

c.  $T = 1,5 \text{ s}$

d.  $\lambda = 24 \text{ cm} = 0,24 \text{ m}$

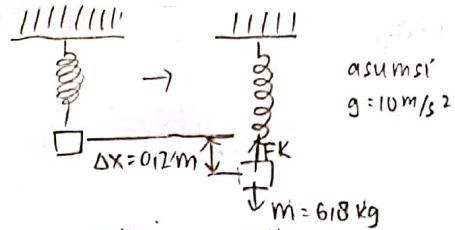
e. cepat rambat gelombang

$$v = \frac{\lambda}{T}$$

$$= \frac{0,24}{1,5} = 0,16 \text{ m/s}$$

$$f \cdot t = 120 \text{ s} \quad n = \frac{t}{T} = \frac{120}{1,5} = 80 \text{ gelombang}$$

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revisi soal b, "menarik ayunan sejauh 8 cm"  
 a.  $\sum F_y = 0$  (ayunan dalam keadaan setimbang)

$$F_k - W = 0$$

$$k \Delta x = mg$$

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

$$k = \frac{618 \cdot 10}{0,12}$$

$$k = 340 \text{ N/m}$$

$$T = 2\pi \sqrt{\frac{m}{k}}$$

$$T = 2\pi \sqrt{\frac{618}{340}}$$

$$T \approx 0,18086 \text{ s}$$

$$y = A \sin(\omega t - kx) \rightarrow v = \frac{dy}{dt}$$

$$v = A \omega \cos(\omega t - kx)$$

agar  $v_{\text{maks}}$   
 $\cos(\omega t - kx) = 1$

$$v_{\text{maks}} = A \omega$$

$$= A \sqrt{\frac{k}{m}}$$

$$= 0,08 \sqrt{\frac{340}{618}}$$

$$\approx 0,1566 \text{ m/s}$$

7. a.  $F = k \Delta x$

$$1 = k (10 - 14,5) \cdot 10^{-2}$$

$$1 = k \cdot 3,5 \cdot 10^{-2}$$

$$k = 2857 \text{ N/m}$$

$$F_0 \rightarrow F_{\text{saat } x=0}$$

b.  $F = F_0 + kx$

$$1 = F_0 + 2857 \cdot 0,0145$$

$$1 = F_0 + 4,143$$

$$F_0 = -3,143 \text{ N}$$

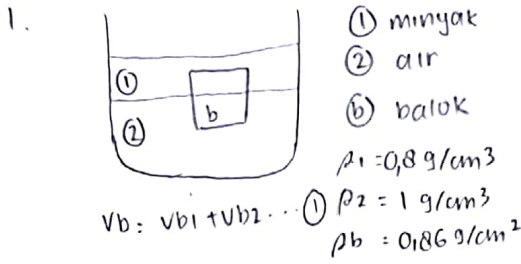
$$F = F_0 + kx$$

$$0 = -3,143 + 2857 \cdot x$$

$$3,143 = 2857x$$

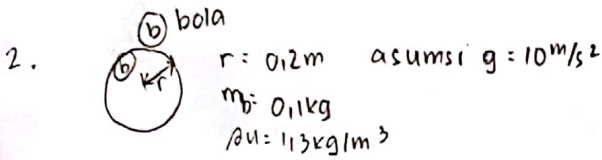
$$x = 0,11 \text{ m}$$

Kunci jawaban Detect Fisika 1



$$\rho_b = \frac{\rho_1 V_{b1} + \rho_2 V_{b2}}{V_b}$$

1)  $0.86 = \frac{0.8 V_{b1} + 1 V_{b2}}{V_{b1} + V_{b2}}$   
 $0.86 V_{b1} + 0.86 V_{b2} = 0.8 V_{b1} + V_{b2}$   
 $0.06 V_{b1} = 0.14 V_{b2}$   
 $\frac{V_{b2}}{V_{b1}} = \frac{3}{7}$   
 $V_{b2} = 306 V_b$   
 $V_{b1} = 706 V_b$



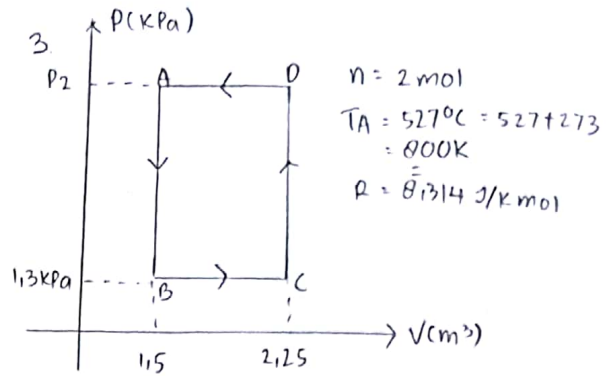
a.  $W_{\text{bola dengan udara}} = W_u + W_{\text{bola}}$   
 $= m_u g + m_b g$   
 $= \rho_u V g + m_b g$   
 $= g \left( \frac{4}{3} \pi r^3 \rho_u + m_b \right)$   
 $= 10 \left( \frac{4}{3} \pi (0.2)^3 \cdot 1.13 + 0.1 \right)$   
 $\approx 1.44 \text{ N}$

b. Buoyant Force  
 $F_b = \rho_u V_b g$   
 $= 1.13 \frac{4}{3} \pi (0.2)^3 \cdot 10$   
 $\approx 0.44 \text{ N}$

$F_b$  merupakan gaya akibat fluida (gas/cair) dimana terdapat perbedaan tekanan pada atas permukaan benda dengan permukaan bawah benda (tekanan permukaan bawah > tekanan permukaan atas)

c.

Hukum Newton II  
 Atan sby  
 $\sum F_y = m_b a$   
 $F_b - W_b = m_b a$   
 $a = \frac{F_b - W_b}{m_b}$   
 $a = \frac{0.44 - 1.44}{0.1}$   
 $a \approx -6.94 \text{ m/s}^2$   
 (- perlambatan)



a). Temperatur & tekanan pada titik D

A → D tekanan sama / isobar

$$\frac{P_A V_A}{T_A} = \frac{P_D V_D}{T_D}$$

$$\frac{1.5}{800} = \frac{2.25}{T_D}$$

$$T_D = \frac{800 \cdot 2.25}{1.5}$$

$$T_D = 1200 \text{ K}$$

Persamaan umum gas ideal

$$(PV = nRT)_D$$

$$2.25 P_A = 2.8314 \cdot 1200$$

$$P_A \approx 0.868,27 \text{ Pa}$$

b). Usaha 1 siklus = luas grafik

$$W = (P_A - 1300)(2.25 - 1.5)$$

$$W = (0.86827 - 1300) 0.75$$

$$W \approx 5676,2025 \text{ J}$$

Usaha 4 siklus = 4 · W  
 $= 4 \cdot 5676,2$   
 $= 22704,8 \text{ J}$

c) Energi dalam pada titik A

Energi dalam untuk monatomik

$$(U = \frac{3}{2} nRT)_A$$

$$U_A = \frac{3}{2} \cdot 2 \cdot 8.314 \cdot 800$$

$$= 19953,6 \text{ J}$$

d) Perubahan energi dalam dari titik A ke D

$$\Delta U_{AD} = Q_{AD} + W_{A-D}$$

$$= n C_p \Delta T + (-P_A \Delta V)$$

$$= n \cdot \frac{5}{2} R \Delta T - P_A \Delta V (2.25 - 1.5)$$

$$= 2 \cdot \frac{5}{2} \cdot 8.314 \cdot (1200 - 800) - 0.86827 \cdot \uparrow$$

$$= 7759,73 \text{ J}$$

$\Delta U_{\text{1 siklus}} = 0$ , karena kondisi awal sama dengan kondisi akhir sehingga tidak ada perubahan

9 a  $\Delta x = 0,005$  "gambaran grafik  
 \*revisi soal c, F-x dimana  
 $F = k \Delta x$  panjang awal  
 tendon 10cm"

$$(4000 - 3200) = k \cdot 0,005$$

$$k = \frac{1600}{0,005}$$

$$k = 320000 \text{ N/m}$$

b.  $W = \frac{1}{2} F \Delta x$

$$W = \frac{1}{2} (4000 - 3200) \Delta x$$

$$W = \frac{1}{2} \cdot 800 \cdot 0,005$$

$$W = 2 \text{ J}$$

c.  $F = F_0 + kx$

$$0 = F_0 + 320000 \cdot 0,1 \text{ m}$$

$$F_0 = -320000$$

$$F = F_0 + kx$$

$$3200 = -320000 + 320000 \cdot x$$

$$35200 = 320000x$$

$$x = 0,111 \text{ m}$$

