

## Quiz Fisika Dasar

1. Dik:  $\rho_{\text{air}} = 1 \text{ gr/cm}^3$   
 $\rho_{\text{minyak}} = 0.8 \text{ gr/cm}^3$   
 $h_{\text{air}} = 10 \text{ cm}$

Penyelesaian:

$$\rho_{\text{air}} = \rho_{\text{minyak}}$$

$$\rho_{\text{air}} \cdot g \cdot h_{\text{air}} = \rho_{\text{minyak}} \cdot g \cdot h_{\text{minyak}}$$

$$1 \cdot 10 = 0.8 \cdot h_{\text{minyak}}$$

$$h_{\text{minyak}} = 12.5 \text{ cm}$$

2. Dik:  $\rho = 0.8 \cdot 10^3 \text{ kg/m}^3$   $\Delta P = 2.8 \text{ kPa}$   
 $U_1 = 3 \text{ m/s}$

Penyelesaian: Hk. Bernoulli

$$\Delta P = \frac{1}{2} \rho (U_2^2 - U_1^2)$$

$$2.8 \times 1000 = \frac{1}{2} \times 0.8 \times 10^3 (U_2^2 - 3^2)$$

$$7 = U_2^2 - 9 \rightarrow U_2 = \sqrt{16} = 4 \text{ m/s}$$

3. Dik:  $m = 0.5$ ,  $k = 200 \text{ N/m}$ ,  $A = 3 \text{ cm} = 0.03 \text{ m}$   
 Dit:  $U_{\text{maks}} = \dots$

Penyelesaian:

$$v = A \omega \cos \omega t$$

$$U_{\text{max}} = A \omega \quad (U \text{ mencapai nilai maks saat } \cos \omega t = 1)$$

$$= A \left( 2\pi \left( \frac{1}{2\pi} \sqrt{\frac{k}{m}} \right) \right)$$

$$= 0.03 \sqrt{\frac{200}{0.5}}$$

$$= 0.6 \text{ m/s}$$

4. Dik:  $y = 2 \sin 2\pi (4t + 2x)$  m

Dit:  $\lambda$  dan  $v$

Penyelesaian:

$$y = 2 \sin (8\pi t - 4\pi x) \text{ m}$$

$$\rightarrow A = 2 \text{ m}$$

$$\omega = 8\pi \text{ rad/s}$$

$$k = 4\pi \text{ m}^{-1}$$

maka:  $\lambda = \frac{2\pi}{k} = \frac{2\pi}{4\pi} = \boxed{\frac{1}{2} \text{ m}}$

$$v = \lambda \cdot f$$

$$= \lambda \cdot \frac{\omega}{2\pi} = \frac{1}{2} \cdot \frac{8\pi}{2\pi} = \boxed{2 \text{ m/s}}$$

5. Dik:  $L = 1 \text{ m}$

$$T_{\text{total}} = 2 \text{ s}$$

$$A = 20 \text{ cm} = 0,2 \text{ m}$$

Dit:  $y = \dots$

Penyelesaian:

$$f = \frac{1}{T} = 2 \text{ Hz}$$

$$\lambda = \frac{L}{4} = 0,25 \text{ m}$$

$$v = f \cdot \lambda = 2 \times 0,25 = 0,5 \text{ m/s}$$

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

$$y = 0,2 \sin \left( 2\pi \left( \frac{t}{0,5} - \frac{x}{0,25} \right) \right)$$

$$= 0,2 \sin (2\pi (2t - 4x))$$

$$\boxed{y = 0,2 \sin (4\pi t - 8\pi x)}$$

6. Dik:  $m = 2 \text{ kg}$   
 $L_1 = 1 \text{ m}$   
 $L_2 = 4 \text{ m}$

Dit:  $f_1 : f_2$

Penyelesaian:  $\frac{f_1}{f_2} = \frac{\frac{1}{2\pi} \sqrt{\frac{g}{L_1}}}{\frac{1}{2\pi} \sqrt{\frac{g}{L_2}}} = \frac{\sqrt{\frac{g}{L_1}}}{\sqrt{\frac{g}{L_2}}}$

$$= \frac{1}{\sqrt{\frac{L_1}{L_2}}} = \frac{1}{\sqrt{\frac{1}{4}}} = \frac{1}{\frac{1}{2}} = 2$$

$$f_1 : f_2 = 2 : 1$$

7. Dik:  $V_1 = V$

Dit:  $V_2 = \dots$

$$T_1 = T$$

$$T_2 = \frac{5}{4} T$$

$$P_1 = P$$

$$P_2 = 2P$$

Penyelesaian:

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

$$\frac{P \cdot V}{T} = \frac{2P \cdot V_2}{\frac{5}{4} T} \Leftrightarrow V = \frac{2V_2}{\frac{5}{4}} \rightarrow V_2 = \frac{5}{8} V$$

8. Dik:  $V = 2 \text{ l}$

$$T_1 = 27^\circ \text{C} + 273,15 = 300,15 \text{ K}$$

$$P_1 = 2 \text{ atm}$$

$$P_2 = 2 + 2 \text{ atm} = 4 \text{ atm}$$

Dit:  $T_2$

Penyelesaian:

$$\frac{P_1}{T_1} = \frac{P_2}{T_2}$$

$$\frac{2}{300,15} = \frac{4}{T_2} \rightarrow T_2 = 600,3 \text{ K} = 327,15^\circ \text{C}$$



9. Dik:  $n = 0,25$

$T_{\text{dingin}} = 0^\circ\text{C} = 273\text{ K}$

Dit:  $T_{\text{panas}} = \dots$

Pengolesaian:

$$\eta = 1 - \frac{T_d}{T_p}$$

$$0,25 = 1 - \frac{273}{T_p}$$

$$T_p = \frac{273}{0,75} = 364\text{ K} = 91^\circ\text{C}$$

10. Dik:  $n = 1\text{ mol}$

$C_p = \frac{5}{2} R$

$P = 10^5\text{ Pa}$

$V_1 = 25\text{ liter} = 0,025\text{ m}^3$

$V_2 = 2 \cdot 0,025 = 0,05\text{ m}^3$

Dit:  $Q$

Pengolesaian:

$Q = n C_p \Delta T$   $\rightarrow T_2 - T_1$

$$= 1 \cdot \frac{5}{2} R \cdot \left( \frac{10^5 \cdot 0,05}{1 \cdot R} - \frac{10^5 \cdot 0,025}{1 \cdot R} \right)$$

$$= \frac{5}{2} R \cdot \left( \frac{5000 - 2500}{R} \right)$$

$$= 5 \cdot 1250$$

$$Q = 6250\text{ J}$$