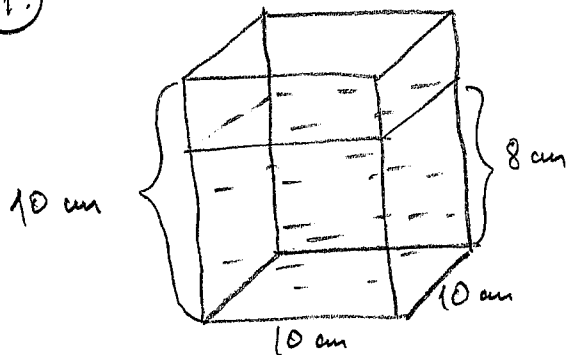


Fluidi - dm - dz 5

ODGOVORI

1.



$$m = 400 \text{ g} = 0.4 \text{ kg}$$

$$a.) V = 10 \text{ cm} \cdot 10 \text{ cm} \cdot 2 \text{ cm} = 200 \text{ cm}^3$$

$$b.) V = 200 \text{ cm}^3$$

$$c.) \rho = \frac{m}{V} = \frac{0.4 \text{ kg}}{200 \cdot 10^{-6} \text{ m}^3} = 2000 \frac{\text{kg}}{\text{m}^3}$$

2.

$$V = 0.1 \text{ m} \times 0.5 \text{ m} \times 0.2 \text{ m}$$

$$\rho = 9000 \frac{\text{kg}}{\text{m}^3}$$

$$P_{\text{max}} = ?$$

$$P_{\text{max}} = \frac{F}{S} = \frac{mg}{S} = \frac{\rho \cdot V \cdot g}{S}$$

$$P_{\text{max}} = \frac{9000 \cdot 0.1 \cdot 0.5 \cdot 0.2 \cdot 10}{0.1 \cdot 0.2} = 45000 \text{ Pa} = 45 \text{ kPa}$$

Napomena: bitno
pouzdem
odgovori!

3.

$$p = \frac{F}{S} = \frac{500 \text{ N}}{5 \cdot 10^{-4} \text{ m}^2} = 1 \text{ MPa}$$

4.

$$p = \rho g h + p_a = 1000 \cdot 10 \cdot 90 + 10^5 = 1 \text{ MPa}$$

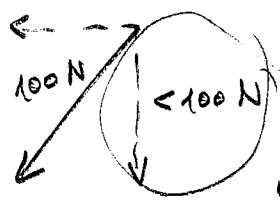
5.
6.

ZANEMARITI! KRIVO ZADANI!

7.

oslovcu a) jer sila djeluje okomito na podlogu.
Tlak je definiran

$$p = \frac{F_{\perp}}{S}$$

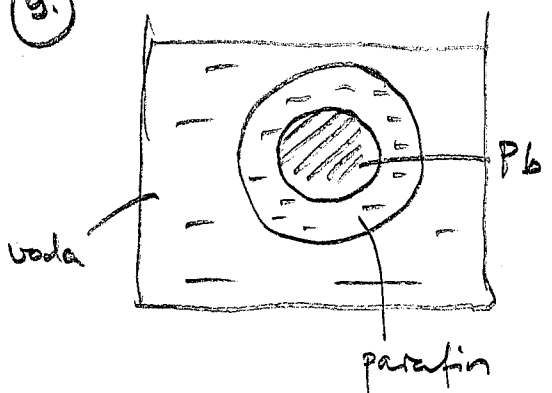


Stvara manji tlak na podlogu

8.

isplivat ce na povrstinu!

9.



$$m_{Pb} = ?$$

$$m_{parafina} = 0,1 \text{ kg}$$

$$\rho_{parafina} = 900 \frac{\text{kg}}{\text{m}^3} ; \rho_{Pb} = 11800 \frac{\text{kg}}{\text{m}^3}$$

Uzgon doci olavo i parafin!

$$F_{uz} = G_{par} + G_{Pb}$$

$$\rho_{vode} \cdot g \cdot V = m_{par} \cdot g + m_{Pb} \cdot g$$

$V =$ volumen parafina i olova

$$V = \frac{m}{\rho}$$

$$\rho_{\text{vođe}} \cdot (V_{\text{par}} + V_{\text{pb}}) = m_{\text{par}} + m_{\text{pb}}$$

$$\rho_{\text{vođe}} \cdot \left(\frac{m_{\text{par}}}{\rho_{\text{par}}} + \frac{m_{\text{pb}}}{\rho_{\text{pb}}} \right) = m_{\text{par}} + m_{\text{pb}}$$

$$1000 \cdot \left(\frac{0.1}{900} + \frac{m_{\text{pb}}}{11800} \right) = 0.1 + m_{\text{pb}}$$

$$0.111 + 0.085 m_{\text{pb}} = 0.1 + m_{\text{pb}}$$

$$0.011 = 0.915 m_{\text{pb}}$$

$$m_{\text{pb}} = 1.2 \cdot 10^{-2} \text{ kg}$$

10.

$$P_1 + \frac{1}{2} \rho v_1^2 + \rho g h_1 = P_2 + \frac{1}{2} \rho v_2^2 + \rho g h_2 \quad \text{Bernoullijeva jednačica}$$

$$S_1 v_1 = S_2 v_2 \quad \text{Jednačica kontinuiteta}$$

$$\cancel{r_1^2} \cdot v_1 = \cancel{r_2^2} \cdot v_2$$

$$v_2 = \frac{1}{2} v_1$$

$$\cancel{r_1^2} v_1 = \frac{1}{4} \cancel{r_1^2} v_2$$

$$v_2 = 4 v_1 = 4 \frac{\text{m}}{\text{s}}$$

$$v_1 = 1 \frac{\text{m}}{\text{s}}$$

$$h_1 = 0$$

$$P_1 = 400\,000 \text{ Pa}$$

$$\rho = 1000 \frac{\text{kg}}{\text{m}^3}$$

$$h_2 = 30 \text{ m}$$

$$P_2 = ?$$

$$400\,000 + \frac{1}{2} \cdot 1000 \cdot 1^2 + 0 = P_2 + \frac{1}{2} \cdot 1000 \cdot 4^2 + 1000 \cdot 10 \cdot 30$$

$$400\,500 = P_2 + 308\,000$$

$$P_2 = 92\,500 \text{ Pa} \sim 9.25 \cdot 10^4 \text{ Pa} \sim 9.82 \cdot 10^4 \text{ Pa}$$

pa sam uzao $g = 10 \frac{\text{m}}{\text{s}^2}$!

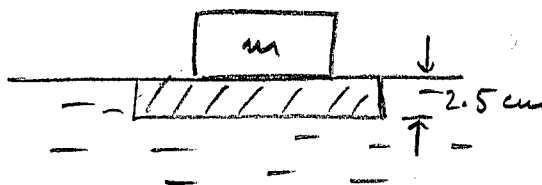
11. hydraulický tlak

12. $V = 3 \text{ m} \times 4 \text{ m} \times 2.5 \text{ cm}$ plocha

$$\rho_{\text{ploče}} = 850 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_{\text{vode}} = 1000 \frac{\text{kg}}{\text{m}^3}$$

$$m = ? \text{ (teret)}$$



$$F_{uz} = G_{\text{ploče}} + G_{\text{tereta}}$$

$$\rho_v \cdot g \cdot V_{\text{ploče}} = m_{\text{ploče}} \cdot g + G_{\text{tereta}}$$

$$\cancel{\rho_v \cdot g} \cdot V_{\text{ploče}} = \rho_{\text{ploče}} \cdot V_{\text{ploče}} \cdot \cancel{g} + m \cdot \cancel{g}$$

$$1000 \cdot 3 \cdot 4 \cdot 0.025 = 850 \cdot 3 \cdot 4 \cdot 0.025 + m$$

$$m = 150 \cdot 3 \cdot 4 \cdot 0.025 = 45 \text{ kg}$$

13.

$$101\,325 \text{ Pa} = 1.01325 \text{ bar}$$

$$1 \text{ bar} = 10^5 \text{ Pa}$$

14.

a.) $p = ?$ to je hydrostatický tlak

$$p = \rho g h \quad h = 30 \text{ cm}$$

$$p = 1000 \cdot 9.81 \cdot 0.3$$

$$p = 2943 \text{ Pa}$$

b.) $p = \rho g h' \quad h' = 1.3 \text{ m}$

$$p = 12753 \text{ Pa}$$

15. ne mogu izlaziti čestice zdaleka ...

16. a) u lijevoj
b) niže (zbog veće visine vode)
c) neće

17. $V = 4 \ell = 4 \text{ dm}^3 = 4 \cdot 10^{-3} \text{ m}^3$

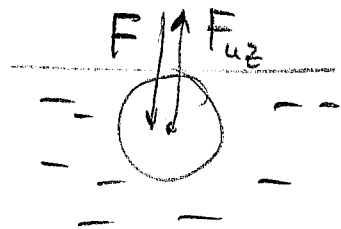
$F = ?$

$F = F_{uz}$

$F_{uz} = \rho_{\text{vode}} \cdot g \cdot V_{\text{kopete}}$

$F_{uz} = 1000 \cdot 9.81 \cdot 4 \cdot 10^{-3} = 39.2 \text{ N}$

$F = 39.2 \text{ N}$



18. opruga će se produžiti jer porast dinamičkog tlaka izaziva privlačenje površina.

19. $S = 5 \text{ cm}^2 = 5 \cdot 10^{-4} \text{ m}^2$

$v = 20 \frac{\text{m}}{\text{s}}$

$t = 60 \text{ s}$

$V = ?$

$l = S \cdot v = \frac{V}{t}$

žetkost struje (vodene, opt.)

$V = S \cdot v \cdot t$

$V = 5 \cdot 10^{-4} \cdot 20 \cdot 60 = 0.6 \text{ m}^3 = 600 \ell$

20. sila uzgona jednaka je na oba tijela jer imaju jednake volumene!

$F_{uz} = \rho_{\text{tek}} \cdot g \cdot V_{\text{udt}}$