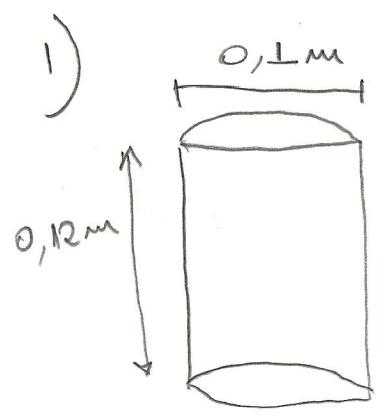


# Dicas Lista Unidade do solo

1



$m = 1,7 \text{ kg}$   
 $m_a = 0,26 \text{ kg}$   
 $\rho_s = 2650 \text{ kg/m}^3$

a)  $U = \frac{m_a}{m_s}$  *já feito*  
 $m_s \rightarrow m = m_a + m_s$

$1 \text{ m}^3 \text{ água} = 1000 \text{ kg} = 1000 \text{ g}$   
 $x = 0,26 \text{ kg}$

b)  $\theta = \frac{V_a}{V}$   
 $\frac{\pi d^2}{4} \cdot h$  (do anel)  
 $9,42 \cdot 10^{-4} \text{ m}^3$

c)  $h = \theta \cdot Z$  *h do cilindro*  
 (resultado em m,  $\times 1000 = \text{mm}$ )

d)  $d = \frac{m_s}{V} = 1528,66 \text{ kg/m}^3$  ou  $1,528 \text{ g/cm}^3$

e)  $\alpha = \left(1 - \frac{d}{\rho_s}\right) = \left(1 - \frac{1528,66}{2650}\right) =$

2)  $m = 220 \text{ kg}$      $U = 0,18 \text{ kg/kg}$   
 $m_s = ?$      $m_a = ?$

$m = m_a + m_s$   
 $220 = 0,18 m_s + m_s$

$U = \frac{m_a}{m_s} \Rightarrow 0,18 = \frac{m_a}{m_s} \Rightarrow m_a = 0,18 m_s$

Resolução da equação

3)  $Z = 0,8 \text{ m}$      $\theta_{\perp} = 0,13 \text{ m}^3 \text{ água/m}^3 \text{ solo}$      $\theta_2 = 0,3 \text{ m}^3/\text{m}^3$   
 $h = (\theta \cdot Z) \Rightarrow (\theta_2 - \theta_{\perp}) \cdot Z = \text{--- m} \times 1000 = \text{--- mm}$

$$4) \theta_{\perp} = 0,1 \text{ m}^3/\text{m}^3$$

$$h = 100 \text{ mm}$$

$$\theta_2 = 0,3 \text{ m}^3/\text{m}^3$$

$$z = ?$$

2

$$h = (\theta_2 - \theta_{\perp}) \cdot z$$

$$0,1 \text{ m} = (0,3 - 0,1) \cdot z = 0,5 \text{ m}$$

$$5) (h) = ? \quad (0,3 - 0,1) \cdot 1,25 = 0,25 \text{ m}$$

$$6) m_D = 0,1 \text{ kg}$$

$$\theta = 0,25 \text{ m}^3/\text{m}^3$$

$$m = m_a + m_D$$

$$d_{\text{solo}} = 1200 \text{ kg}/\text{m}^3 / 1000 \rightarrow \text{pl / pna p/g}$$

$$m = ?$$

$$U = \frac{m_a}{m_D}$$

$$\theta = U \cdot d$$

$$0,25 = U \cdot 1200 \text{ kg}/\text{m}^3 / \text{solo}$$

$$0,2083 = \frac{m_a}{0,1}$$

$$U = 2,083 \cdot 10^{-4} \frac{\text{m}^3 \text{ agua}}{\text{kg solo \& a}}$$

$$m_a = 0,02083 + 0,1$$

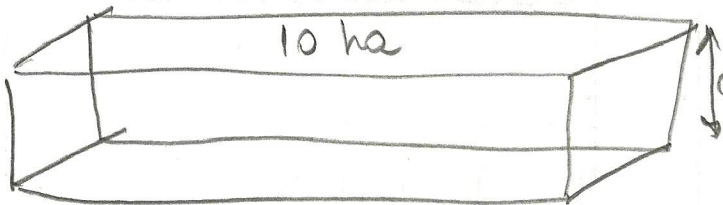
$$0,12083 \text{ kg}$$

$$\text{pna p/ kg/ kg} \cdot \frac{1}{1000} =$$

$$1 \text{ m}^3 = 1000 \text{ kg}$$

$$2,083 \cdot 10^{-4} = X \quad X = 0,2083 \frac{\text{kg H}_2\text{O}}{\text{kg solo}}$$

7)



$$10 \text{ ha} = 100\,000 \text{ m}^2$$

$$V = 30\,000 \text{ m}^3$$

$$m_D = ?$$

$$\text{Litros} = ?$$

$$U = 0,2 \frac{\text{kg agua}}{\text{kg solo}}$$

$$U = \frac{m_a}{m_D}$$

$$\rho = 1700 \frac{\text{kg solo}}{\text{m}^3 \text{ solo}} \left( \frac{m_D}{V} \right)$$

$$1700 = \frac{m_D}{V}$$

$$0,2 = \frac{m_a}{m_D}$$

$$m_D \text{ em kg}$$

$$m_a \text{ em kg}$$

b)  $\theta_{cc} = 0,3 \text{ m}^3/\text{m}^3$

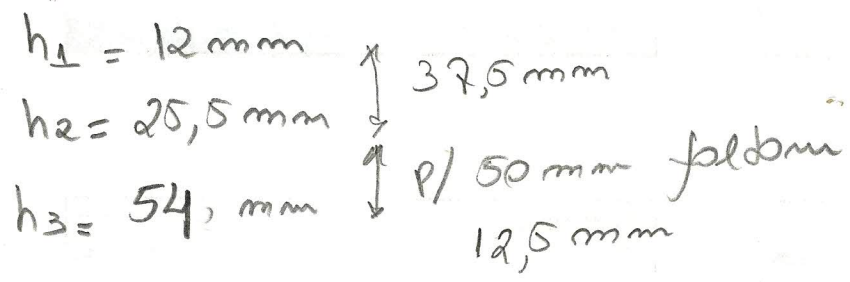
$\rho / \rho_{\text{água}} \text{ m}^3 / \text{kg}$

3

Prof. (m)	U	$\rho$	$\theta$	h
0,05 m	0,05	1200	$\theta = U \cdot \frac{\rho}{1000} = 0,06$	
0,15 m	0,10	1300		
0,60 m	0,15	1400		
0,20 m	0,12	1400		

$h = (\theta_{cc} - \theta) \cdot Z$   
 $h = (0,3 - 0,06) \cdot 0,25$   
 $h = 0,06 \text{ m}$

$h = 12 \text{ mm}$



- 54 mm — 0,6
- 12,5 mm — X
- X = 0,138 mm

fora tubo: Canote 1 = 0,05 m  
 " 2 = 0,15 m  
 " 3 = 0,138 m  
 até aonde a água chegou

$0,338 \text{ m}$

g)  $\phi = h = 7,5 \text{ cm}$

$\rho_U = 560 \text{ g}$   
 $\rho_D = 458 \text{ g}$

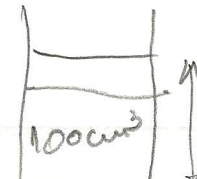
$d_{\text{óleo}} = ? = \frac{\rho_D}{\rho_U} = 1,38 \text{ g/cm}^3$

$U = ?$   
 $\theta = ?$

$U = \frac{m_a}{m_D} = \frac{\rho_U - \rho_D}{\rho_D} = 0,22278 \frac{\text{g}}{\text{g}}$

$\theta = \frac{V_a}{V} = \frac{\rho_U - \rho_D}{\rho_D} = 0,3078 \frac{\text{cm}^3_{\text{água}}}{\text{cm}^3_{\text{óleo}}}$

$V = \frac{\pi d^2}{4} \cdot h = 331,339 \text{ cm}^3$

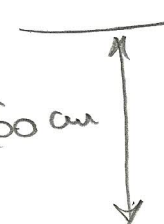
10)   $d_s = \frac{m_s}{V_s} = \frac{P_s}{V_s} = \frac{458}{(269-100)} = 2,71 \text{ g/cm}^3$  (4)

11) Porosidade total ( $\alpha$ )  $\alpha = \left(1 - \frac{1,38}{2,71}\right) = 49,08\%$   
 II livre de água =  $\alpha - \theta = 0,4908 - 0,3078 = 0,183$   
 18,3%

saturação relativa =  $\frac{30,78\%}{49,08\%} = 62,71\%$   
 Como lista a resposta está errada.

12)  $V = 200 \text{ cm}^3$   $m = 332 \text{ g}$   $m = 360 \text{ g}$   
 $Z = 10 \text{ cm}$   $m_s = 281 \text{ g}$   $m_s = 305 \text{ g}$

$m_a = m - m_s$	$d = \frac{m_s}{V} = 1,405 \text{ g/cm}^3$	$1,525 \text{ g/cm}^3$
$\Delta$	$U = \frac{m_a}{m_s} = 18,15\%$	$18,03\%$
	$\theta = \frac{V_a}{V} = 25,5\%$	$27,5\%$
	$\alpha = 1 - \frac{d}{d_p} = 47,96\%$	$\alpha = 43,52\%$
	$2,7$	

13)   $\theta = 38,3\%$   
 $h = \theta \cdot Z = 0,383 \cdot 60 = 22,98 \text{ cm}$  ou  $229,8 \text{ mm}$