

A

$$\textcircled{1.} \quad m = 800 \text{ g} = 0,8 \text{ kg} \quad \rho = 750 \text{ kg/m}^3$$
$$m = V \cdot \rho \quad \rightarrow \quad V = \frac{m}{\rho} = \frac{0,8}{750} = 0,001066\bar{6} \text{ m}^3$$
$$V = 1066,7 \text{ cm}^3$$

$$V = \frac{4}{3} \pi r^3$$
$$r^3 = \frac{3V}{4\pi} \quad \rightarrow \quad r = \sqrt[3]{\frac{3 \cdot 1066,7}{4 \cdot 3,14}} = 6,3 \text{ cm}$$
$$d = 2 \cdot r = 2 \cdot 6,3 = 12,6 \text{ cm}$$

$$\textcircled{2.} \quad \text{kulica' usica} \quad r = 5 \text{ cm}; \quad \rho = 4 \text{ cm}$$

$$V = \frac{\pi \cdot r \cdot d}{6} (3\rho^2 + r^2)$$

$$r = R - m$$

$$m^2 = R^2 - \rho^2$$

$$r = 5 - 3$$

$$m^2 = 25 - 16$$

$$r = \underline{\underline{2 \text{ cm}}}$$

$$m = 3$$

$$V = \frac{3,14 \cdot d}{6} \cdot (3 \cdot 4^2 + 2^2)$$

$$V = \underline{\underline{54,4 \text{ cm}^3}}$$

3

1. $S = 407 \text{ dm}^2$

$$S = 4\pi r^2$$

$$407 = 4 \cdot 3,14 \cdot r^2 \rightarrow r^2 = \frac{407}{4 \cdot 3,14} = 32,29$$

$$r = 5,7 \text{ dm}$$

$$V = \frac{4}{3}\pi r^3 = \frac{4}{3} \cdot 3,14 \cdot 5,7^3 = 1466,25 \text{ dm}^3$$

$$= 1466,25 \text{ l} = \underline{\underline{1466,25 \text{ l}}}$$

2. kulová výšeň: $r = 34 \text{ cm}$; $\rho = 1,6 \text{ dm} = 16 \text{ cm}$;
 $n = 4 \text{ cm}$

$$V = \frac{2}{3}\pi r^2 \cdot n = \frac{2}{3} \cdot 3,14 \cdot 34^2 \cdot 4 = \underline{\underline{9649,57 \text{ cm}^3}}$$

$$S = 2\pi r n + \pi \rho r = 2 \cdot 3,14 \cdot 34 \cdot 4 + 3,14 \cdot 16 \cdot 34 = \underline{\underline{2562,24}}$$

③

$$①. V = 670 \text{ hl} = 67000 \text{ l} = 67 \text{ m}^3$$

$$V = \frac{4}{3} \pi r^3$$

$$67 = \frac{4}{3} \cdot 3,14 \cdot r^3 \rightarrow r^3 = \frac{3 \cdot 67}{4 \cdot 3,14} = 16$$

$$\underline{r = 2,52 \text{ m}}$$

$$S = 4 \pi r^2 = 4 \cdot 3,14 \cdot 2,52^2 = \underline{\underline{79,76 \text{ m}^2}}$$

②. Kulová vrstva: $\rho_2 = 7 \text{ cm}$, $\rho_1 = 5 \text{ cm}$, $r = 2 \text{ cm}$

$$V = \frac{1}{6} \pi r (3\rho_1^2 + 3\rho_2^2 + r^2)$$

$$V = \frac{1}{6} \cdot 3,14 \cdot 2 (3 \cdot 7^2 + 3 \cdot 5^2 + 2^2)$$

$$V = 236,55 \text{ cm}^3$$

①

① $V = 141 \text{ hl} = 14100 \text{ l}$, $+12\%$; $S = ?$

$$V = \frac{4}{3} \pi r^3$$

$$14100 = 4\pi r^3$$

$$\rightarrow r^3 = \frac{14100}{4 \cdot 3,14} = 1122,61$$

$$\underline{\underline{r = 10,39 \text{ dm}}}$$

$$S = 4\pi r^2 = 4 \cdot 3,14 \cdot 10,39^2 = 1355,89$$

$$1355,89 \cdot 1,12 = \underline{\underline{1519 \text{ m}^2}}$$

② kuloda' vyřec': $r = 5,3 \text{ m} = 53 \text{ dm}$; $r = 8 \text{ dm}$

$$V = \frac{2}{3} \pi r^2 \cdot r$$

$$V = \frac{2}{3} \cdot 3,14 \cdot 53^2 \cdot 8$$

$$\underline{\underline{V = 47041 \text{ dm}^3}}$$

$$m = r - r$$

$$m = 53 - 8$$

$$\underline{\underline{m = 45 \text{ dm}}}$$

$$Q^2 = r^2 - m^2$$

$$Q^2 = 53^2 - 45^2$$

$$\underline{\underline{Q = 28 \text{ dm}}}$$

$$S = 2\pi r r + \pi Q r$$

$$S = 2 \cdot 3,14 \cdot 53 \cdot 8 + 3,14 \cdot 28 \cdot 53$$

$$\underline{\underline{S = 7322,48 \text{ dm}^2}}$$

①

1. $r_1 = 3 \text{ cm}$, $r_2 = 4 \text{ cm}$, $r_3 = 5 \text{ cm}$

$$V_1 = \frac{4}{3} \pi r_1^3$$

$$V_2 = \frac{4}{3} \pi r_2^3$$

$$V_3 = \frac{4}{3} \pi r_3^3$$

$$V = V_1 + V_2 + V_3 = \frac{4}{3} \pi (r_1^3 + r_2^3 + r_3^3) =$$
$$= \frac{4}{3} \cdot 3,14 \cdot (27 + 64 + 125) = 904,32 \text{ cm}^3$$

$$V = \frac{4}{3} \pi r^3 \rightarrow r^3 = \frac{3V}{4\pi} = \frac{3 \cdot 904,32}{4 \cdot 3,14} = 216$$

$$\underline{\underline{r = \sqrt[3]{216} = 6 \text{ cm}}}$$

$$S = 4\pi r^2 = 4 \cdot 3,14 \cdot 6^2 = \underline{\underline{452,16 \text{ cm}^2}}$$

2. Kulová vrstva: $r = 8,5 \text{ cm}$; $\rho_1 = 7,7 \text{ cm}$, $\rho_2 = 6,8 \text{ cm}$,
 $r = 0,15 \text{ dm} = 1,5 \text{ cm}$

$$V = \frac{1}{6} \pi r (3\rho_1^2 + 3\rho_2^2 + r^2)$$

$$S = \pi\rho_1^2 + \pi\rho_2^2 + 2\pi r r$$

$$V = \frac{1}{6} \cdot 3,14 \cdot 1,5 (3 \cdot 7,7^2 + 3 \cdot 6,8^2 + 1,5^2)$$

$$S = 3,14 \cdot 7,7^2 + 3,14 \cdot 6,8^2 + 2 \cdot 3,14 \cdot 8,5 \cdot 1,5$$

$$\underline{\underline{V = 250,29 \text{ cm}^3}}$$

$$\underline{\underline{S = 411,43 \text{ cm}^2}}$$

6

1. $D = 30 \text{ cm}$, $h = 10 \text{ mm} = 1 \text{ cm}$

$$R = 15 \text{ cm}$$

$$r = 15 - 1 = 14 \text{ cm}$$

$$V = \frac{4}{3} \pi r^3 = \frac{4}{3} \cdot 3,14 \cdot 14^3 = 11488,21 \text{ cm}^3$$
$$= 11,5 \text{ dm}^3 = \underline{\underline{11,5 \text{ L}}}$$

2. Kalod vrtca: $r = 65 \text{ mm}$, $\rho_1 = 63 \text{ mm}$, $\rho_2 = 2,5 \text{ cm} = 25 \text{ mm}$

$$\rho_2 = 2,5 \text{ cm} = 25 \text{ mm}$$

$$V = \frac{1}{6} \pi r (3\rho_1^2 + 3\rho_2^2 + r^2)$$

$$V = \frac{1}{6} \cdot 3,14 \cdot 65 (3 \cdot 63^2 + 3 \cdot 25^2 + 65^2)$$

$$V = 361933,1 \text{ mm}^3$$

$$r = r_1 - r_2 = 60 - 16 = \underline{\underline{44 \text{ mm}}}$$

$$r_1^2 = r^2 - \rho_2^2 \quad r_2 = r - \rho_1$$

$$r_1^2 = 65^2 - 25^2$$

$$r_2 = 65 - 63^2$$

$$\underline{\underline{r_1 = 60 \text{ mm}}}$$

$$\underline{\underline{r_2 = 16 \text{ mm}}}$$

$$S = \pi \rho_1^2 + \pi \rho_2^2 + 2\pi r r$$

$$S = 3,14 \cdot 63^2 + 3,14 \cdot 25^2 + 2 \cdot 3,14 \cdot 65 \cdot 44$$

$$S = \underline{\underline{32385,96 \text{ mm}^2}}$$

(4)

$$\textcircled{1.} \quad S = 153,94 \text{ cm}^2; \quad \rho = 8100 \text{ kg/m}^3$$

$$S = 4\pi r^2$$

$$153,94 = 4 \cdot 3,14 r^2 \rightarrow r = \sqrt{\frac{153,94}{4 \cdot 3,14}} = 3,5 \text{ cm}$$

$$V = \frac{4}{3}\pi r^3 = \frac{4}{3} \cdot 3,14 \cdot 3,5^3 = 179,5 \text{ cm}^3 = \underline{\underline{0,0001795 \text{ m}^3}}$$

$$m = V \cdot \rho = 0,0001795 \cdot 8100 = \underline{\underline{1,45 \text{ kg}}}$$

$$\textcircled{2.} \text{ kulová uševě: } r = 58 \text{ cm}; \quad \rho = 4,2 \text{ dm} = 42 \text{ cm}$$

$$V = \frac{2}{3}\pi r^2 \cdot n$$

$$n = r - m$$

$$m^2 = r^2 - \rho^2$$

$$V = \frac{2}{3} \cdot 3,14 \cdot 58^2 \cdot 18$$

$$n = 58 - 42$$

$$m^2 = 58^2 - 42^2$$

$$n = 18 \text{ cm}$$

$$m = 40 \text{ cm}$$

$$\underline{\underline{V = 120755,52 \text{ cm}^3}}$$

$$S = 2\pi r n + \pi \rho r$$

$$S = 2 \cdot 3,14 \cdot 58 \cdot 18 + 3,14 \cdot 42 \cdot 58$$

$$\underline{\underline{S = 14205,36 \text{ cm}^2}}$$

①

$$①. I = 60000 \text{ l}, 450 \text{ l} / \text{m}^2, V = ? \text{ hl}$$

$$60000 : 450 = \underline{80}$$

$$S = 80 \text{ m}^2$$

$$S = 4\pi r^2$$

$$80 = 4 \cdot 3,14 \cdot r^2$$

$$\underline{r = \sqrt{\frac{80}{4 \cdot 3,14}}} = \underline{2,52 \text{ m}}$$

$$V = \frac{4}{3}\pi r^3 = \frac{4}{3} \cdot 3,14 \cdot 2,52^3 = \underline{\underline{64 \text{ m}^3}}$$

$$64 \text{ m}^3 = 64000 \text{ l} = \underline{\underline{640 \text{ hl}}}$$

$$②. \text{ kulový vrchol: } r = 5 \text{ cm}, \rho = 4 \text{ cm}$$

$$S = 2\pi r n$$

$$m^2 = r^2 - \rho^2$$

$$n = r - m$$

$$S = 2 \cdot 3,14 \cdot 5 \cdot n$$

$$m = \sqrt{25 - 16}$$

$$\underline{m = 3 \text{ cm}}$$

$$\underline{n = 2 \text{ cm}}$$

$$\underline{\underline{S = 62,8 \text{ cm}^2}}$$

(1)

$$1. \quad \sigma_{\min} = 68 \text{ cm}$$

$$r = 2r_1$$

$$68 = 2 \cdot 3,14 \cdot r_1$$

$$r_1 = \frac{68}{2 \cdot 3,14} = 10,83 \text{ cm}$$

$$S_1 = 4 \cdot \pi \cdot r_1^2$$

$$S_1 = 4 \cdot 3,14 \cdot 10,83^2$$

$$\underline{S_1 = 1479 \text{ cm}^2}$$

$$\sigma_{\max} = 71 \text{ cm}$$

$$71 = 2 \cdot 3,14 \cdot r_2$$

$$r_2 = \frac{71}{2 \cdot 3,14} = 11,31 \text{ cm}$$

$$S_2 = 4 \cdot 3,14 \cdot 11,31^2$$

$$\underline{S_2 = 1607 \text{ cm}^2}$$

2. Kulocel' vrstka: $r = 205 \text{ mm}$; $\rho_1 = 187 \text{ mm}$,
 $\rho_2 = 123 \text{ mm}$, $r = \rho_{\text{cm}} = 80 \text{ mm}$

$$V = \frac{1}{6} \pi \cdot r \cdot (3\rho_1^2 + 3\rho_2^2 + r^2)$$

$$V = \frac{1}{6} \cdot 3,14 \cdot 80 \cdot (3 \cdot 187^2 + 3 \cdot 123^2 + 80^2)$$

$$V = 6560253,44 \text{ mm}^3 = 6,56 \text{ dm}^3$$

$$S = \pi \rho_1^2 + \pi \rho_2^2 + 2\pi r r$$

$$S = 3,14 \cdot 187^2 + 3,14 \cdot 123^2 + 2 \cdot 3,14 \cdot 205 \cdot 80$$

$$S = 260299,72 \text{ mm}^2 = 26 \text{ dm}^2$$