



Многопрофильная
инженерная олимпиада
«Звезда»

шифр 58-07-18

Задание	1	2	3	4	5	6	7	8	Всего
Баллы	0	0	13	0	10	10	12	10	55

Вариант 1

$\sqrt{3}$

1. $\rightarrow 3$
2. $\rightarrow 13$
3. $\rightarrow 20$ $\leftarrow$: 30 см 0
4. $\rightarrow 8$: 30 см 1
5. $\rightarrow 14$: 30 см 2
6. $\rightarrow 20$: 30 см 0

$$\begin{array}{r} 2024 \overline{) 3} \\ -18 \\ \hline 22 \\ -21 \\ \hline 14 \\ 12 \\ \hline 2 \end{array}$$

185

2 (ост.) $\Rightarrow$ на 2024 месте стоит 14

Ответ: 14

Дано:

$Q \cdot \mu^3 = 1650 \text{ мм}^3/\text{мин} = 1,65 \text{ м}^3/\text{мин}$

$a_1 = 3 \text{ м}$

$l_2 = 40 \text{ мм} \approx 0,4 \text{ м}$

$W_2 = 40 \text{ мм} = 0,4 \text{ м}$

$h_2 = 190 \text{ мм} = 1,9 \text{ м}$

$t = ?$

$\sqrt{5}$ Решение

$t = \frac{V}{Q} = \frac{V}{Q \cdot \mu^3}$

$V = V_1 - V_2$

$V_1 = a^3$

$V_2 = l_2 W_2 h_2$

$V = a^3 - l_2 W_2 h_2$

$t = \frac{a^3 - l_2 W_2 h_2}{Q \cdot \mu^3}$

$= \frac{26,468 \text{ м}^3}{1,65 \text{ м}^3/\text{мин}} \approx 16 \text{ мин}$

Ответ: $t = 16 \text{ мин}$

Дано:

См

$L = 10 \text{ см}$

18 м

$W = 12 \text{ см}$

$8,4 \text{ м}$

$h = 12 \text{ см}$

$5,4 \text{ м}$

$\sqrt{6}$ Решение:

$N = \frac{S \cdot V_{\text{до}}}{S_{\text{до}} \cdot V_{\text{до}}} = \frac{S}{25 \text{ м}^2}$

$S = S_1 + S_2 + S_3 + S_4 - (S_0 \cdot 8)$

$S_0 = l_1 \cdot W_1 = 0,9 \text{ м} \cdot 1,35 \text{ м} = 1,215 \text{ м}^2$

Datw:
 $L_1 = 2 \text{ m}$
 $W_1 = 3 \text{ m}$
 $S_{10} = 5 \text{ m}^2$
 $V_{10} = 5 \text{ l}$
 $N = ?$

Cu:
 $0,9 \text{ m}$
 $1,35 \text{ m}$

Beurteil:

$S_1 = hW = S_3$

$S_2 = hL = S_4$

$S = hW + hL + hW + hL - (L_1 W_1 \cdot 8) = 2hW + 2hL - (L_1 W_1 \cdot 8) =$
 $= 2h(W + L) - (L_1 W_1 \cdot 8) = 2 \cdot 8 \cdot (1 + 1,35) - (2 \cdot 3 \cdot 8) = 10,8 \cdot 8 - 48 = 86,4 - 48 = 38,4 \text{ m}^2$
 $= 2 \cdot 19,2 \text{ m}^2$

$N = \frac{38,4 \text{ m}^2}{2,5 \text{ m}^2} = 15,36 = 16$

Antwort: $N = 16$

N 3

Datw:

$S_n = \frac{1}{4}$

$S_{n1} = \frac{1}{4}$

$S_{n2} = \frac{3}{4}$

$t_2 = 3t$

$t_1 = t$

Ueb?

$\frac{U_b}{U_n} = ?$

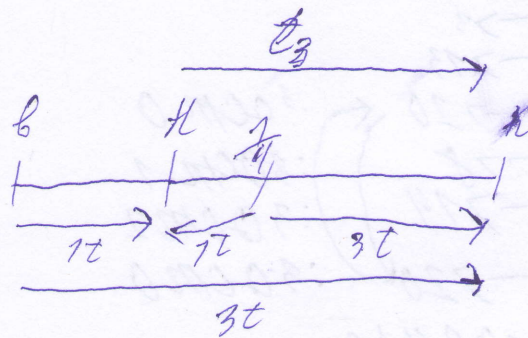
Beurteil:

$U_n = \frac{S_n}{t_1} = \frac{1/4}{t} = \frac{0,25}{t}$

$U_b = \frac{S_b}{t_2} = \frac{3/4}{3t} = \frac{0,75}{3t} = \frac{0,25}{t}$

$t_3 = 3t - t = 2t$

$\frac{U_b}{U_n} = \frac{0,25}{0,25} = \frac{0,25}{0,25} = 1$



Antwort: $\frac{U_b}{U_n} = 1$

N 8

Datw:

$\rho_1 = 1,52 \text{ g/cm}^3$

$\rho_2 = 7,8 \text{ g/cm}^3$

$\frac{\rho_{cp1}}{\rho_{cp2}} = ?$

Beurteil:

$\rho_{cp1} = \frac{m_{cp1}}{V_{cp1}}$

$\rho_{cp2} = \frac{m_{cp2}}{V_{cp2}}$

$= \frac{54,62}{V}$

$\rho_{cp1} = \frac{30,62}{0,44 \text{ m}^3} = 69,59$

$\rho_{cp2} = \frac{54,62}{0,61 \text{ m}^3} = 89,54$

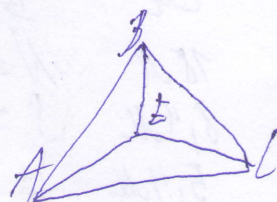
$\frac{\rho_{cp2}}{\rho_{cp1}} = \frac{89,54}{69,59} = 1,28$

$= 1,28$

Antwort: $\frac{\rho_{cp2}}{\rho_{cp1}} = 1,28$

N 7

Antwort: $162,5 + 1 \text{ BAE}$



$$\begin{aligned}
 \angle BEC &= 180^\circ - 2\angle BEA - 2\angle AEC + 4\angle AEC + 4\angle BAE = 150^\circ = 30^\circ - 2/360^\circ \cdot BEC - \cancel{180^\circ} \\
 - 2/360^\circ \cdot BEC - BEA + 4\angle BAE &= 30^\circ - 2 \cdot 360^\circ + 2\angle BEC + 4\angle BAE + \\
 - \angle BEC &= 30^\circ - 2 \cdot 360^\circ + 4\angle BAE = 30^\circ - 720^\circ + 4\angle BAE = -690^\circ + 4\angle BAE \\
 0 &= 30^\circ - 720^\circ + BEC + 4\angle BAE = -690^\circ + BEC + 4\angle BAE \\
 \angle BEC + 4\angle BAE &= 690^\circ \\
 4\angle BAE &= 690^\circ - BEC \\
 \angle BEC &= 690^\circ - 690^\circ
 \end{aligned}$$

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$$\begin{array}{r}
 9 \times 0,01319 \\
 17 \quad 3,80,67
 \end{array}$$