2021 .
(III)

10 .

1. .

2. ,
   , .

3.
   .
   !
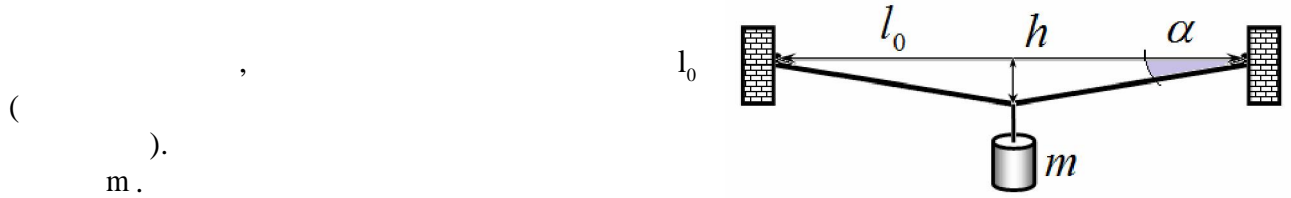
3. .

4. , ,
   , .

5. , ,
   .

> !
> , , . ,
> . , !
> , . ,
> , .

:
- (1 .);
- 3 (5 .);

10-1.

l_0 F_{max}
(   ). m_0 .   ,

(   ) x   F

$$F = kx .$$ (1)

k -   .

1.

,

(
).
m .

1.1   h .
1.2   ?

,   ,

α .

$$\sin \alpha \approx \mathrm{tg}\,\alpha \approx \alpha$$
$$\cos \alpha \approx 1 - \frac{\alpha^2}{2}$$ (2)

2.

ω .

2.1   (   )
?
2.2   ,
?
2.3   (
)?

X   .   .   1   2

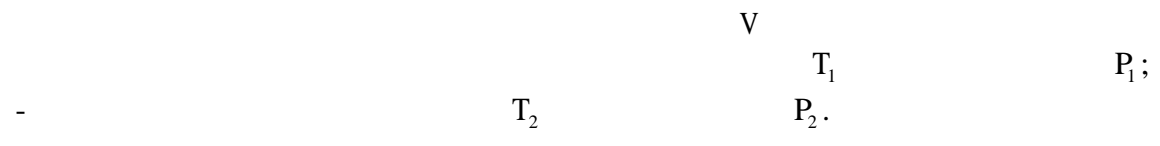10-2.

, (. .   )   .

(R -

):

$$c_1 = \frac{3}{2}R :$$

$$c_2 = \frac{5}{2}R ;$$

$$c_3 = \frac{6}{2}R .$$

$$\frac{1+x}{1+y} \approx 1+x-y ,$$

x, y ≪ 1

1.

V   .

T_1 P_1 ;

-                                   T_2 P_2 .

1.1	,	.
1.2		$\frac{\Delta P}{P}$,
	Q .	

2.

T_0 .

Q .

2.1	ΔT_0 ,
	.

,

—   .

T_0 (,   ).

T_0

$$\eta = \alpha(T - T_0), \tag{1}$$

α -   .

,   ,   .

«   »   (   ).

(,

)   q .

X   .   .   1   3

2.2 ΔT
                          Q   .
          , $\Delta T \ll T_0$.
2.3 ΔT_0 ΔT ?
                  .

3.   .

                                              (   )   ,
                                                    ,
T_0 .

$$2H_2 + O_2 = 2H_2O + q .$$ (2)
                    (   ).
          q -   ,   ,   1   .

3.1   ,   .
3.2   (   ), $q = 0$.
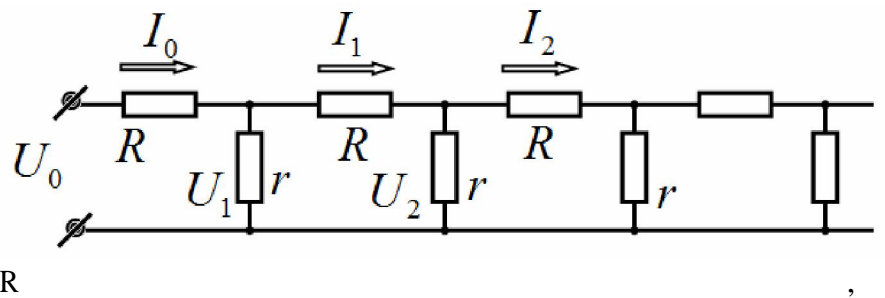   ,   ?   .

X   .   .   1   4

10-3 .

$d = 5,0$.

$h = 1,0$.

$\rho_0 = 1,7 \cdot 10^{-8}$ · ;

$\rho_1 = 2,1 \cdot 10^{11}$ ·

1. .

1.1 R $L = 1,0$.	
1.2 r	
, (,	
).	

2. .

,

,   .

.

,

,

.

R   ,
r -   .   ,   ,
. 1.1 -1.2.

$k = 0, 1, 2.....$ R
$I_0, I_1, I_2...,$ r - $U_0, U_1, U_2....$
U_0.

2.1 k - I_k U_k U_{k+1}	
.	
2.2 , U_{k-1}, U_k, U_{k+1}	
.	

, $U_0, U_1, U_2 ...$

.   ,

$$U_k = U_0 \lambda^k \qquad\qquad (1)$$

2.3	.			(1)		,
		λ .				.

2.4
$1 = 2000$.

, $U_0, U_1, U_2 ...$