

1.1.

\_\_\_\_\_.

:

1) \_\_\_\_\_,

,

2) \_\_\_\_\_.

\_\_\_\_\_.

\_\_\_\_\_.

\_\_\_\_\_.

\_\_\_\_\_,  $1,6 \cdot 10^{-19}$  \_\_\_\_\_.

$6,022 \cdot 10^{23} \text{ mol}^{-1} \cdot 1 \text{ mol}$  ( ) 64 g.

\_\_\_\_\_.

\_\_\_\_\_, \_\_\_\_\_.

,

\_\_\_\_\_,  $\text{H}_2\text{SO}_4$

\_\_\_\_\_,  $\text{H}^+$

$\text{SO}_4^{2-}$  :



\_\_\_\_\_ -

\_\_\_\_\_.

\_\_\_\_\_  $I$  - \_\_\_\_\_,

\_\_\_\_\_.

$q$  \_\_\_\_\_  $t$ ,

:

$$I = \frac{q}{t}.$$

SI [ ].

\_\_\_\_\_ -

\_\_\_\_\_.

\_\_\_\_\_ -

.

\_\_\_\_\_ -

,

.

\_\_\_\_\_  $j$  -

,

.

$S$

$I$ ,

:

$$j = \frac{I}{S}.$$

SI

:

$$\left[ \frac{\text{A}}{\text{m}^2} \right].$$

\_\_\_\_\_, \_\_\_\_\_.

:

,

-

,

,

,

,

.

.

.

\_\_\_\_\_ -

,

.

$q$ ,

:

$$\mathcal{E} = \frac{A}{q}.$$

SI

:

$$\left[\frac{\text{J}}{\text{C}}\right] \quad [\text{V}].$$

\_\_\_\_\_.

\_\_\_\_\_ -  $I$   
 $U$

:

$$I = G.U = \frac{1}{R}.U.$$

$G$ ,  $R$

.

SI

:

$$\left[\frac{\text{V}}{\text{A}}\right]$$

[ ].

SI

[S].

,

$R$

$l$

$S$

:

$$R = \frac{\rho.L}{S},$$

.

SI

:

. [ .m].

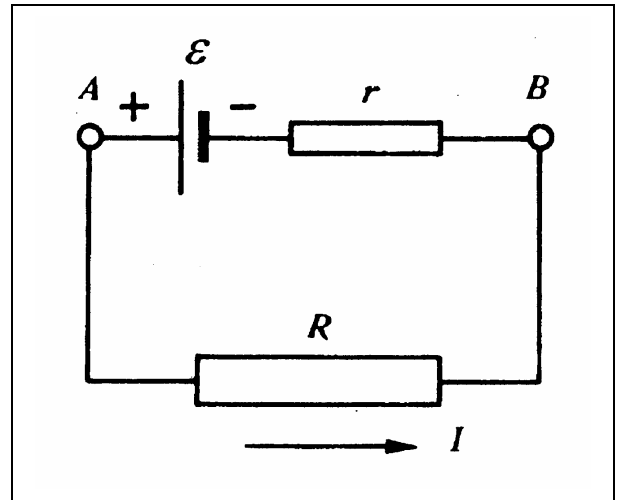
.

$$\left[\frac{\Omega.\text{mm}^2}{\text{m}}\right].$$

$$= 0,017 \frac{\Omega.\text{mm}^2}{\text{m}},$$

$$= 0,028 \frac{\Omega.\text{mm}^2}{\text{m}}.$$

\_\_\_\_\_.



$r$ ,

,

.

:

$$I = \frac{\mathcal{E}}{R + r}.$$

\_\_\_\_\_

-

,

,

,

.

$A$ ,

$$U, \quad : \quad = q \cdot U.$$

$q$ ,

$$t, \quad q = I \cdot t,$$

$I$

.

$A$

:

$$A = U \cdot I \cdot t.$$

\_\_\_\_\_

-

,

:

$$P = \frac{A}{t} = U \cdot I.$$

-

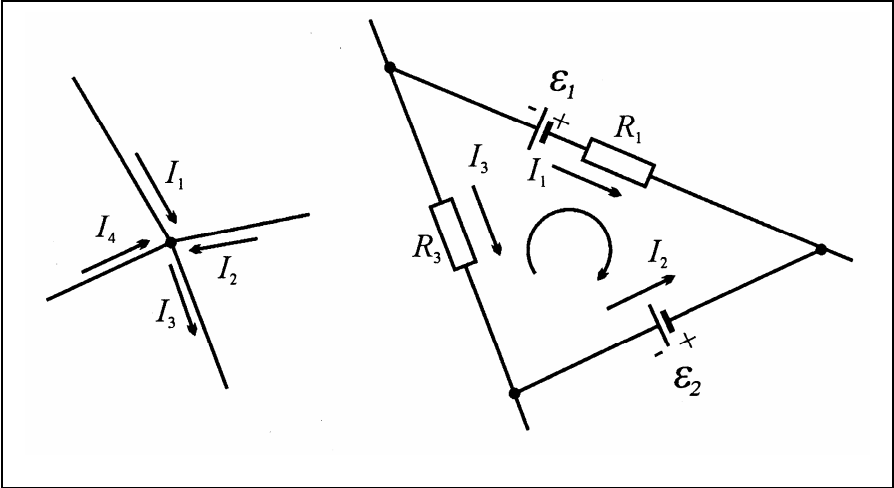
.

$\sum_{i=1}^n I_i = 0$

$$\sum_{i=1}^n I_i = 0$$

$I_1 + I_2 - I_3 + I_4 = 0$

$$I_1 + I_2 - I_3 + I_4 = 0$$



$I$

$R$

$\mathcal{E}$

$$\sum_{i=1}^n I_i \cdot R_i = \sum_{j=1}^m \mathcal{E}_j$$

,  
 ,  
 ,  
 :

$$I_1.R_1 - I_3.R_3 = U_1 - U_2.$$

:

1.  
 .  
 .  
 ,  
 ,  
 .

2.

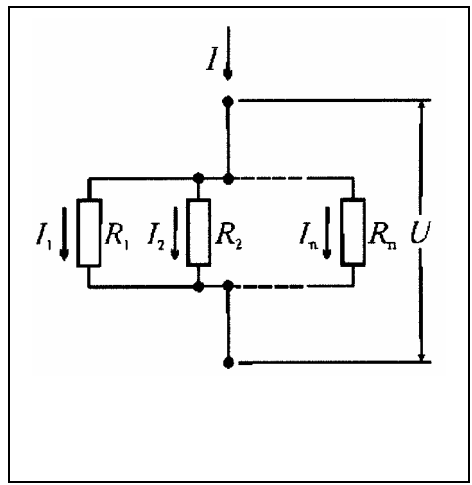
$I.R$  ,  
 . ,  
 ,  
 - .

3.  
 ,  
 .  
 .  
 ,  
 .

\_\_\_\_\_.

- -

$U.$   
 $I$   
 :  
 $I = I_1 + I_2 + \dots + I_n$   
 $R,$   
 :



$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \dots + \frac{1}{R_n}$$

$$R_1, R_2, \dots, R_n$$

\_\_\_\_\_

,  $I$

$U$

$$U = U_1 + U_2 + \dots + U_n$$

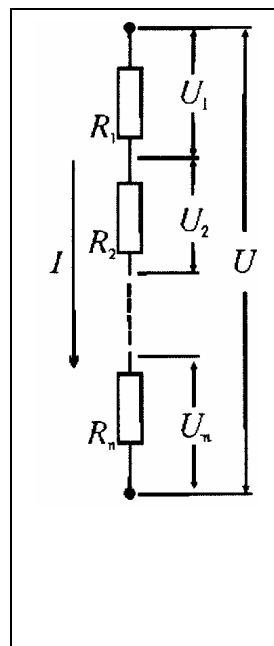
$R$  :

$$R = R_1 + R_2 + \dots + R_n$$

$$R_1, R_2, \dots, R_n$$

.

$R$



-

\_\_\_\_\_.

45 - 120 .h.

11-14 V.

0,002 - 0,010

200 - 500

..... J, kWh.

\_\_\_\_\_

13 - 14,5 V.

0,02 - 0,10 .

30 - 90

..... W.

\_\_\_\_\_

12 V.

200 - 500 .

..... .

\_\_\_\_\_

12 V.

15 - 25 .

..... .

\_\_\_\_\_

12 V.

3, 5, 10, 15, 21, 60, 65,70,75 W.

..... .

\_\_\_\_\_

12 V.

20 - 100 W.

..... .



\_\_\_\_\_ -

,

.

\_\_\_\_\_  $T$  - ,

[s].

.

\_\_\_\_\_  $f$ ,

-

-

.

<sup>1</sup>/s,

[ z].

$$: f = \frac{1}{T}$$

\_\_\_\_\_  $U_m$

.

[V].

\_\_\_\_\_  $u$

$t$

:

$$u = U_m \cdot \sin(\omega.t) = U_m \cdot \sin(2.\pi.f.t),$$

.

$$f = 2. f.$$

:

= 2.  $f.t = .t.$  [rad].

\_\_\_\_\_  $R$  - ,

.

:

$$i = \frac{u}{R}$$

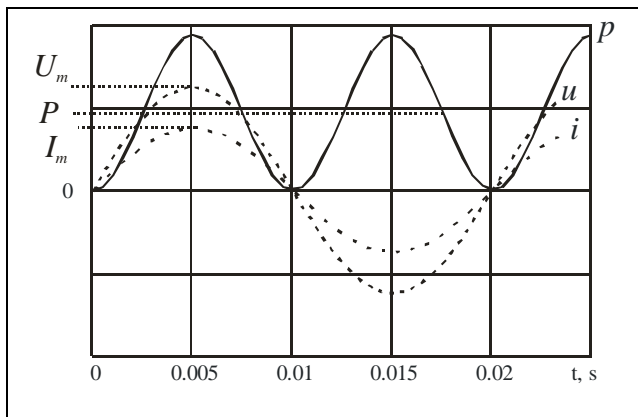
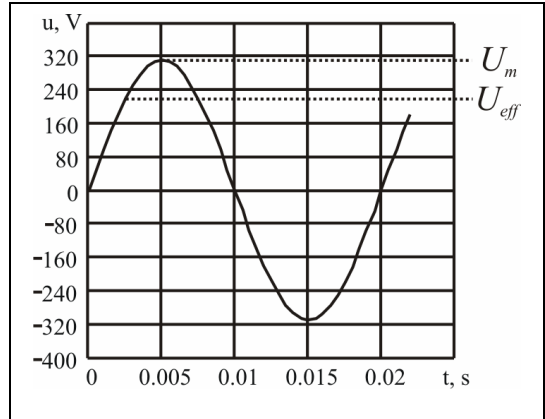
$$I_m = \frac{U_m}{R}$$

$U_m$

$I_m$

.

[ ].



$$P = \frac{1}{T} \cdot \int_0^T U_m \cdot \sin(2\pi \cdot f \cdot t) \cdot I_m \cdot \sin(2\pi \cdot f \cdot t) \cdot dt = 0,5 \cdot U_m \cdot I_m.$$

$$P = \sqrt{0,5} \cdot U_m \cdot \sqrt{0,5} \cdot I_m = U_{eff} \cdot I_{eff},$$

$$U_{eff} = \sqrt{0,5} \cdot U_m = 0,71 \cdot U_m$$

$$U_{eff} = \sqrt{0,5} \cdot I_m = 0,71 \cdot I_m$$

$U_{eff}$

$I_{eff}$