***Tole bi school***

Tasks on the power of electric current

$8^{th}$ grade

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***Task number 1.***

In the course of 10 minutes, for some part, an electric current is flowing, the value of which is 250 mA . The voltage in this area is 4 V. It is necessary to determine the power of the electric current, which is released in this area, and the work of the electric current produced during this time.

Given: SI Solution

t = 10 min = 600 s P = U I =4⋅ 0.25 =1W

U = 4 V

I = 250 mA = 0.25 A W= Pt = 1⋅600 = 600 J

find: P= ?

 W= ? Answer:1 W , 600 J

***Task number 2.***

We include two 25 W and 100 W lamps in a 220 V electrical circuit. How much is the current strength in these lamps?

Given: SI Solution

P1 = 100 W Δ$ I= I\_{1}-I\_{2}$

P2 = 25 W P = U I

U = 220 V $I\_{1}=\frac{P\_{1}}{U}$ = $\frac{100}{220}=0.45 A$

find:

ΔI =? $I\_{2}=\frac{P\_{2}}{U}$ = $\frac{25}{220}=0.11 A$

 ΔI= 0.45-0.11=0.34 A

 Answer: 0.34 A

***Task number 3***

Determine the power of the current in the lamp, if at a voltage of 110 V the current in it is

200 mA.

Given: SI Solution

U= 110 V P= U I

 I = 200 mA = 0.2 A P= 0.2 A ⋅ 110 V= 22 W

 Find:

 P= ?

 Answer: 22 W

***Task number 4***

Determine the power of the current in the electric lamp, if the resistance of the filament of the lamp is 400 Ohms, and the voltage on the filament is 100 V.

Given: Solution

R = 400Ohm P= U I

U= 100V I = $\frac{ U}{R}$

Find:

P=? I = $\frac{100}{400}=0.25 A$

 P= 0.25 ⋅100= 25 W.

 Answer: 25 W

***Task number 5***

Determine the strength of the current in the lamp of an electric torch, if the voltage on it is 6 V, and the power is 1.5 W.

Given: Solution

U= 4.5V P= U I

P= 1.5 W I= $\frac{P}{U}$

Find: I= $\frac{1.5}{6}=$0.25 A

I =? Answer: 0.25 A.

***Task number 6***

A wind turbine is installed in the mountain village, which drives an 8 kW electric generator. How many 40 W bulbs can be powered from this power source if 5% of the power is consumed in the supply wires?

Given: SI Solution

P=8 kW=8000 W since 5% of power is spent on the supply wires for the lamps,

P1= 40 W 95% remains, that is, Pb = 0.95

Pb= 0.95 P P= 0.95⋅ 8000 W = 7.6⋅10³ W

Find: N = $\frac{P}{P1}=\frac{7600}{40}=$190 bulb

N=?

 Answer: 190 bulb

***Task number 7***

The current in the soldering iron is 4.6 A at a voltage of 220 V. Determine the power of the current in the soldering iron.

Given: Solution

I = 4.6 A P= U⋅I

U= 220 V P = 4.6⋅220 = 1000W

Find:

P=? Answer: 1000W.

***Task number 8***

Is the current power in conductors the same?



Given: Solution

R1= 50 Ohm resistors are connected in series I= $I\_{1}=I\_{2}$ and

R2= 10 Ohm $P\_{1}=I^{2}R\_{1}$

Find: $P\_{2}=I^{2}R\_{2}$

 $\frac{P\_{ 1}}{P\_{2} } $= ? $\frac{P\_{1}}{P\_{2}}= \frac{I^{2}R\_{1}}{I^{2}R\_{2}}$ $\rightarrow $ $\frac{P\_{1}}{P\_{2}}=\frac{R\_{1}}{R\_{2}}$ ;

 $\frac{P\_{ 1}}{P\_{2} }= \frac{50}{10}=5$ $P\_{1}=5P\_{2}$

 Answer: power consumption $R\_{1}$ is 5 times more.

***Task number 9***

 120 V is written on the balloon of the first lamp; 100 W, and on the second balloon - 220 V; 100 watts. Lamps are connected to the mains with the voltage for which they are designed. Which lamp has a greater current; how many times?

Given: Solution

U1= 120 V $P\_{1}=I\_{1} U\_{1}$ ;

U2= 220 V $P\_{2}=I\_{2} U\_{2}$ ;

P1= 100W $\frac{P\_{1}}{P\_{2}}=\frac{I\_{1}U\_{1}}{I\_{2}U\_{2}}$ → $\frac{I\_{1}}{I\_{2}}=\frac{P\_{1}U\_{2}}{P\_{2}U\_{1}}=$ $\frac{100⋅220}{100⋅120}=1.83$

P2= 100 W

Find: $\frac{I\_{1}}{I\_{2}}=?$ Answer: the current in the first lamp is 1.83 times .

***Task number 10***

Two lamps are parallel connected to the 120 V network: 1 - 300 W rated for 120 V and 2 connected in series with a resistor - 12 V. Determine the readings of the ammeters A1 and A and the resistance of the resistor, if the A2 meter shows the strength current 2 A.



Given: Solution

U = 120 V $P\_{1}=I\_{1}U\_{1};$

P1= 300W $I\_{1}=\frac{P\_{1}}{U\_{1}}=\frac{300 W}{120V}=2.5 A$

U1=120 V I=$ I\_{1}+I\_{2}=$ 2.5 A+2 A = 4.5 A

U2= 12 V R= $\frac{U\_{R}}{I\_{2}}$

I2= 2 A $U\_{R}=$ U - $ U\_{2}$

Find: R = $\frac{U-U\_{2}}{I\_{2}}$ = $\frac{120 V-12V}{2A}=54 $Ohm

I1=?

I=?

R=? Answer: 54 Ohm.

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