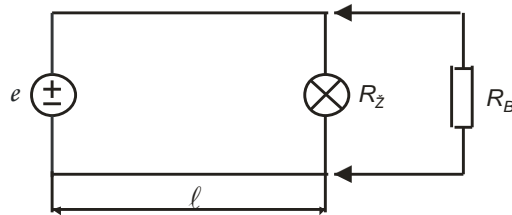


2. domaća zadaća iz Osnova elektrotehnike i elektronike

1. Žarulja snage $P_{\dot{z}} = 100 \text{ W}$ spojena je na napon gradske mreže 230V/50Hz vodom od bakra duljine $l = 50 \text{ m}$, presjeka $S = 4 \text{ mm}^2$ i specifičnog otpora $\rho = 0,0175 \text{ } \Omega\text{mm}^2/\text{m}$. Izračunajte napon i snagu žarulje. Koliki su napon i snaga žarulje, ako se paralelno žarulji spoji bojler snage $P_B = 2,5 \text{ kW}$?



Rješenje:

$$E = 230 \text{ V}$$

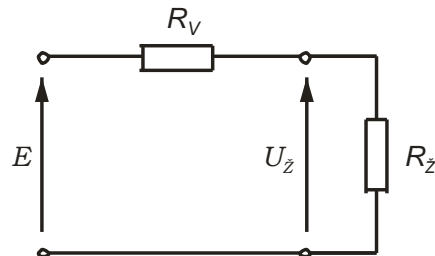
- a) Priključena je samo žarulja:

$$R_{\dot{z}} = \frac{E^2}{P_{\dot{z}}} = 529 \text{ } \Omega,$$

$$R_V = \rho \cdot \frac{2l}{S} = 437,5 \text{ m}\Omega$$

$$U_{\dot{z}} = \frac{R_{\dot{z}}}{R_{\dot{z}} + R_V} \cdot E = 229,81 \text{ V}$$

$$P_{\dot{z}} = \frac{U_{\dot{z}}^2}{R_{\dot{z}}} = 99,83 \text{ W}$$



- b) Priključeni su i žarulja i bojler:

$$R_B = \frac{E^2}{P_B} = 21,16 \text{ } \Omega,$$

$$R_T = R_{\dot{z}} \parallel R_B = 20,346 \text{ } \Omega$$

$$U_{\dot{z}} = U_T = U_B = \frac{R_T}{R_T + R_V} \cdot E = 225,16 \text{ V}$$

$$P_{\dot{z}} = \frac{U_{\dot{z}}^2}{R_{\dot{z}}} = 95,83 \text{ W}$$

