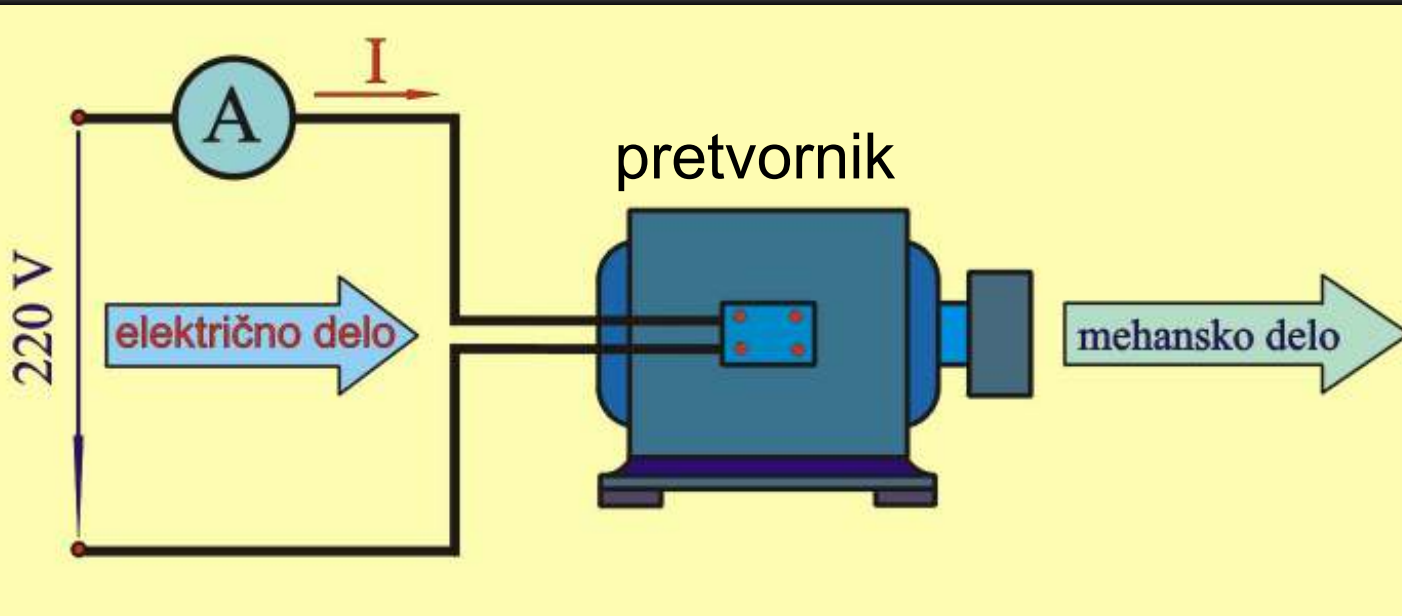


ELEKTRIČNO DELO



$$W = U \cdot Q \quad (Ws = J) \quad Q = I \cdot t$$

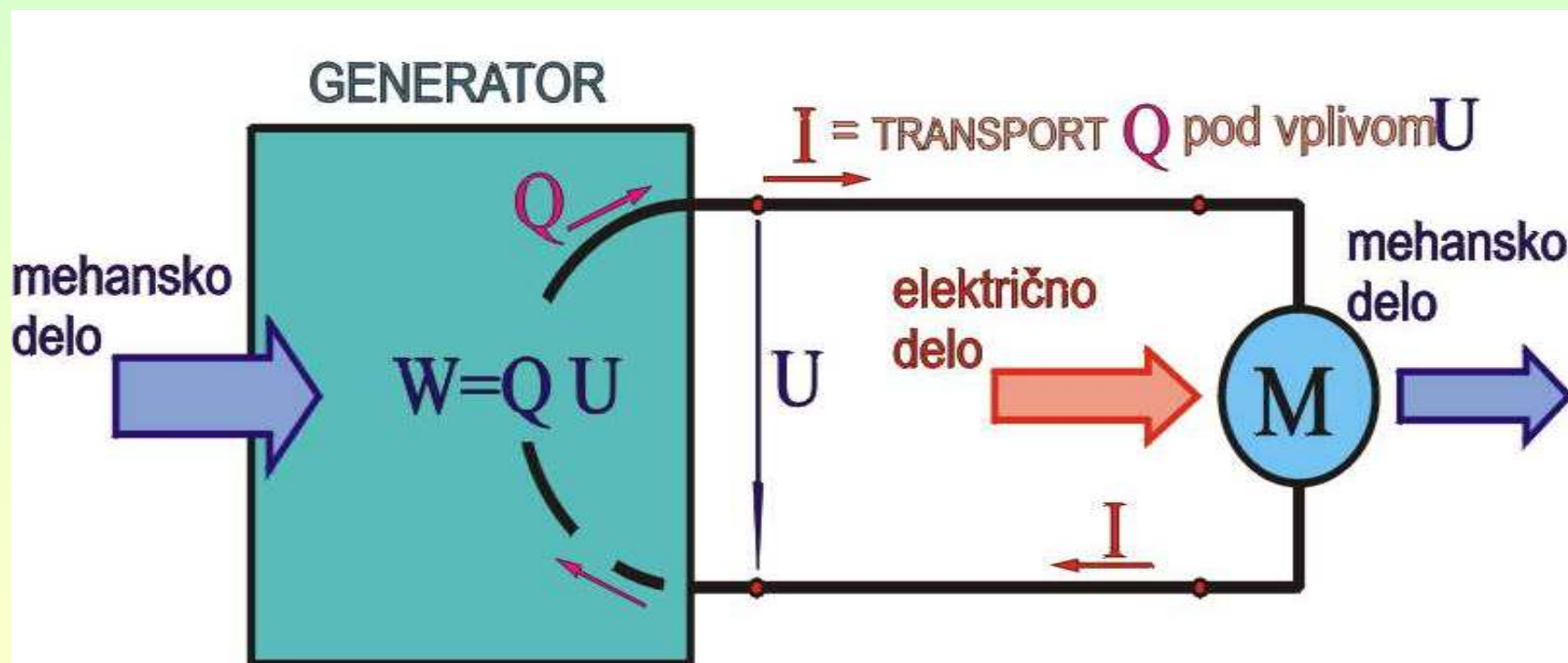
$$W = U \cdot I \cdot t$$

$$W = I^2 \cdot R \cdot t$$

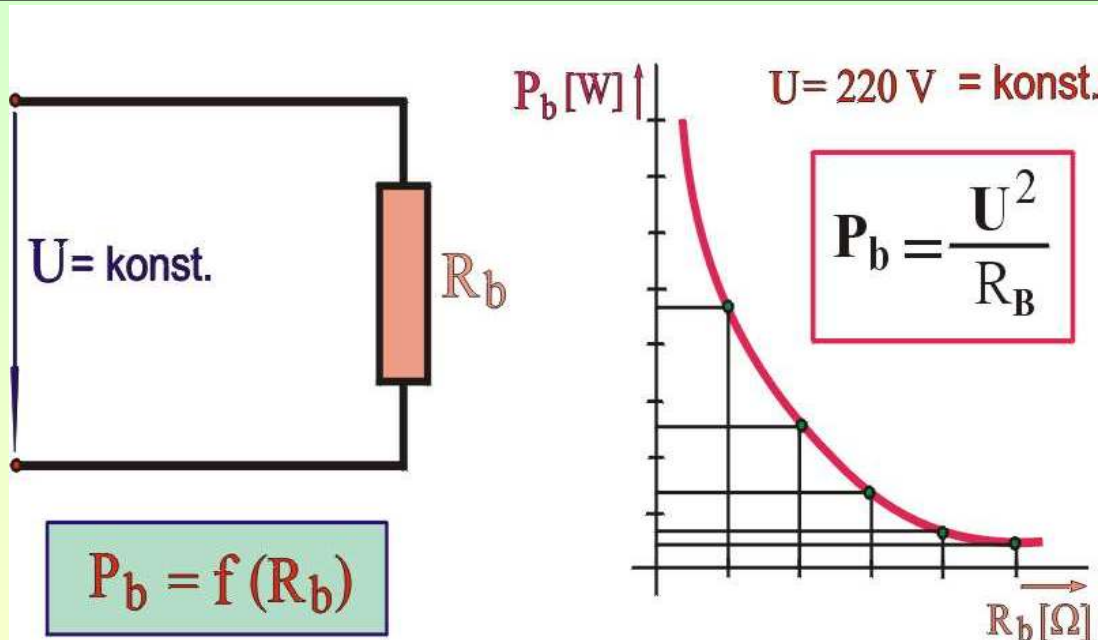
$$W = U^2 \cdot t / R$$

$$3,6 \cdot 10^6 \text{ Ws} = 1 \text{ kWh}$$

ELEKTRIČNO DELO



ELEKTRIČNA MOČ



Odvisnost moči od upornosti porabnika

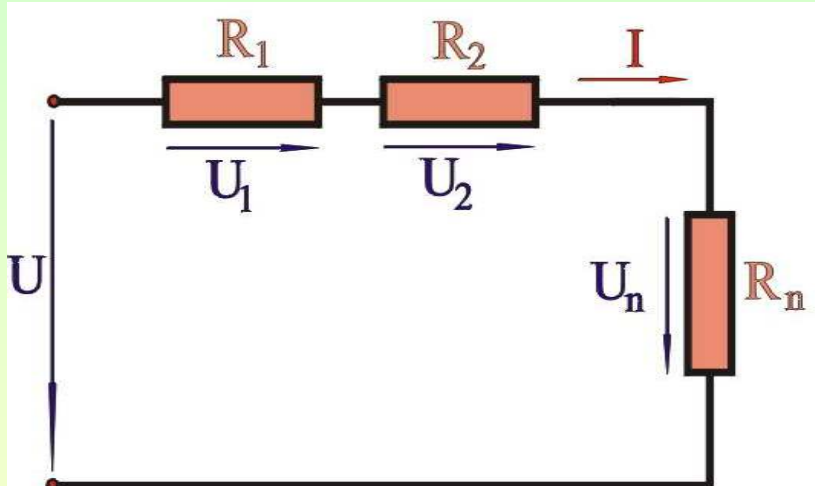
$$P = W / t = U \cdot I \quad (\text{W})$$

$$P = I^2 \cdot R$$

$$P = U^2 / R$$

ELEKTRIČNA MOČ

- sestavljene vezave porabnikov

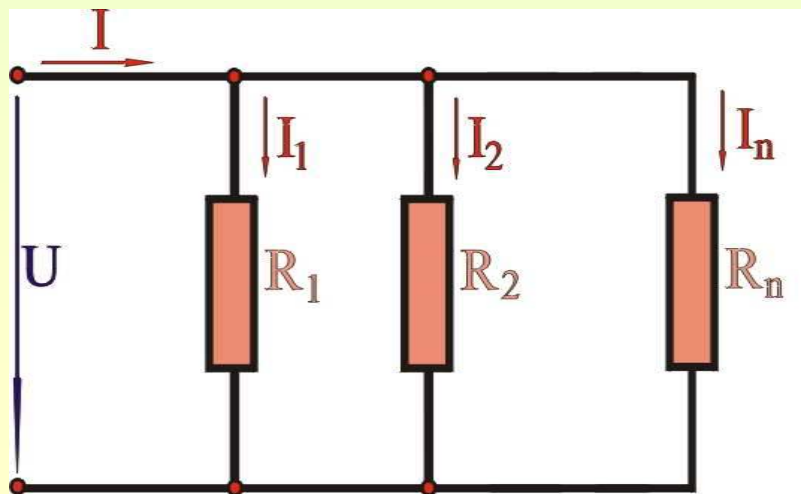


Zaporedno vezanih porabnikov:

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

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

$$P = P_1 + P_2 + \dots + P_n$$



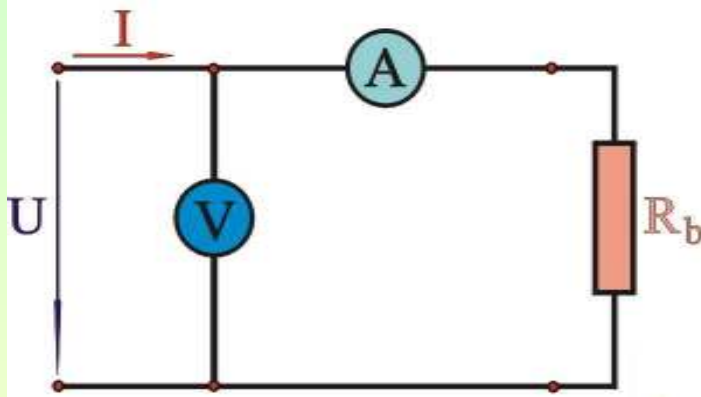
Vzporedno vezanih porabnikov:

$$I = I_1 + I_2 + \dots + I_n$$

$$U \cdot I = U \cdot I_1 + U \cdot I_2 + \dots + U \cdot I_n$$

$$P = P_1 + P_2 + \dots + P_n$$

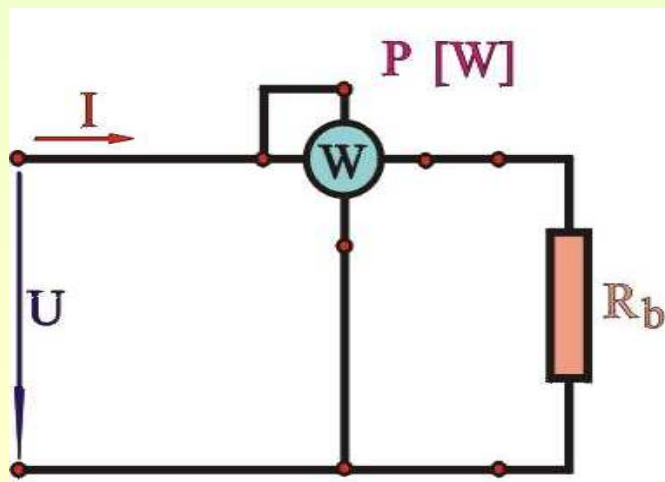
MERJENJE ELEKTRIČNE MOČI



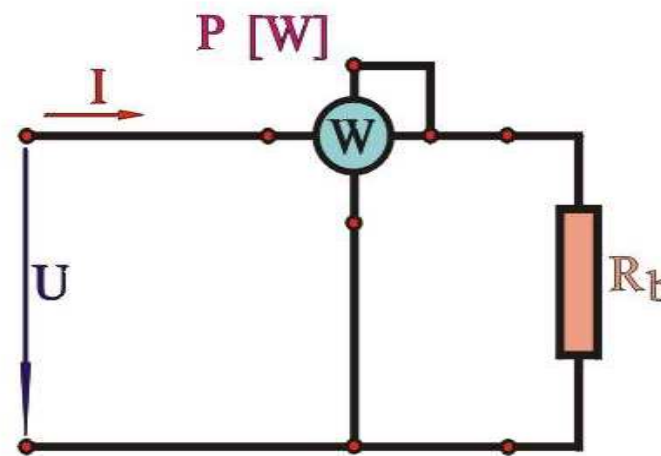
Posredno merjenje moči

$$P = U \cdot I$$

Neposredno merjenje moči

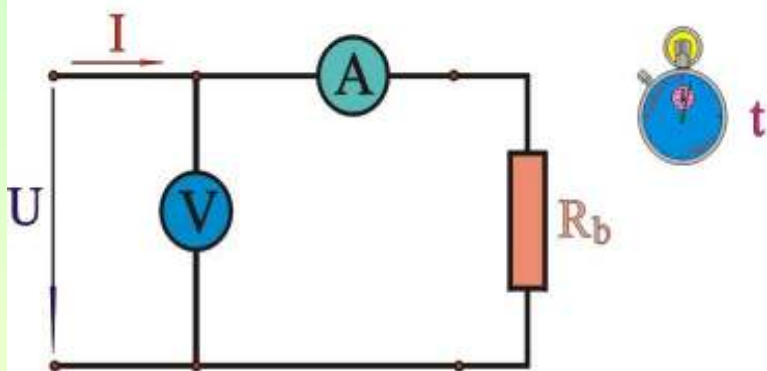


R_b - velika



R_b - majhna

MERJENJE ELEKTRIČNEGA DELA



$$W = U I t \text{ [Ws]}$$

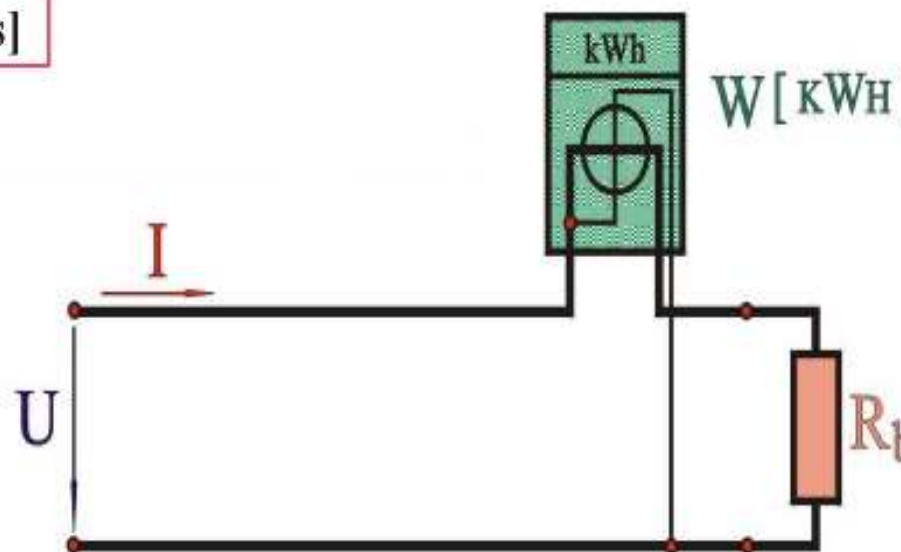
Posredno merjenje z
 U - I metodo

Neposredno merjenje z el.
števcom

$$W = n / k \text{ (kWh)}$$

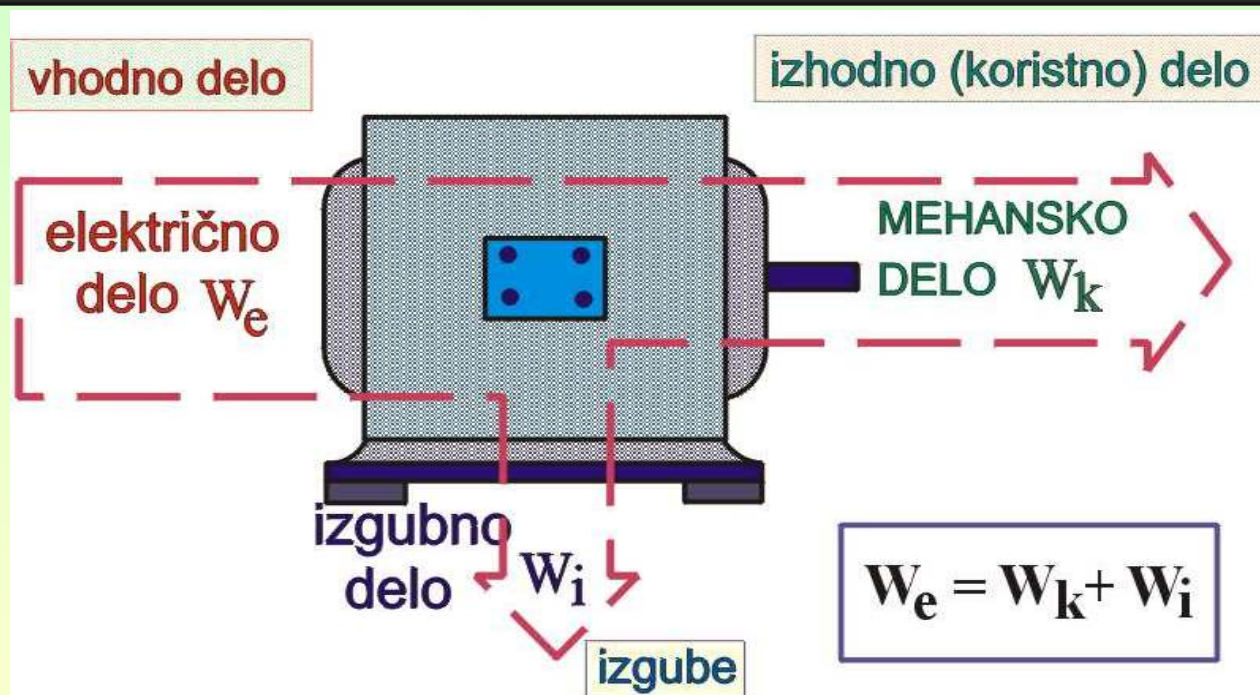
n - št. vrtljajev rotorja števca v
določenem času

k - konstanta števca (vrt/kWh)



PRETVARJANJE ELEKTRIČNE ENERGIE

Izkoristek

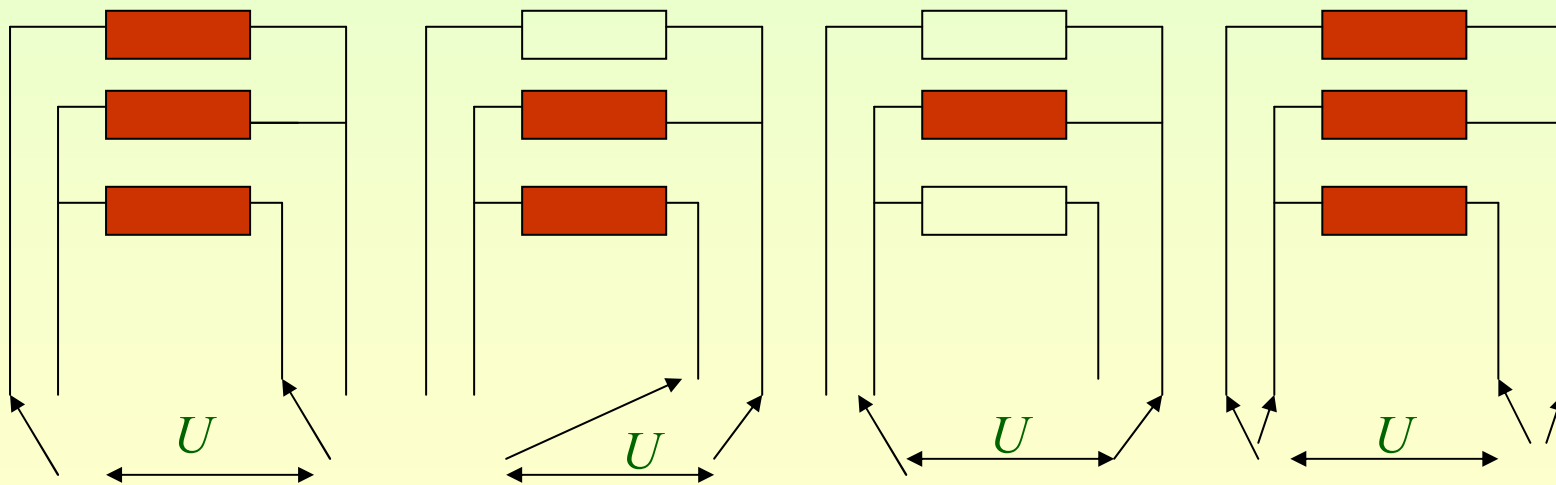


$$\eta = W_k / W_e \quad \text{ali} \quad \eta = (W_k / W_e) \cdot 100 \quad (\%)$$

$$\eta = P_k / P_e \quad \text{ali} \quad \eta = (P_k / P_e) \cdot 100 \quad (\%)$$

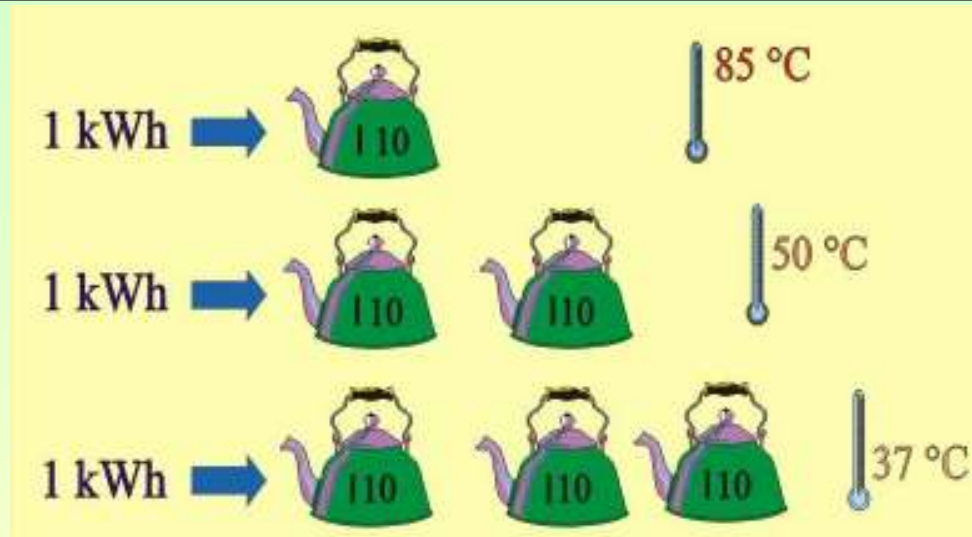
REGULACIJA MOČI PORABNIKOV

- z napetostjo
- s tokom
- z upornostjo
- z bimetali



Regulacija moči el. grelnikov

TOPLOTNO DELO ELEKTRIČNEGA TOKA



Joulov zakon:

$$W_t = I^2 \cdot R \cdot t \text{ (Ws)}$$

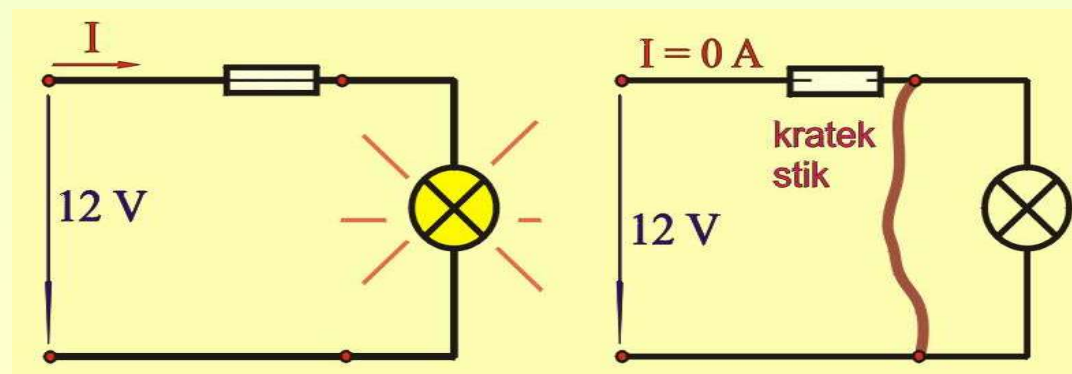
Segrevanje snovi:

$$W_t = c \cdot m \cdot \Delta T \text{ (Ws)}$$

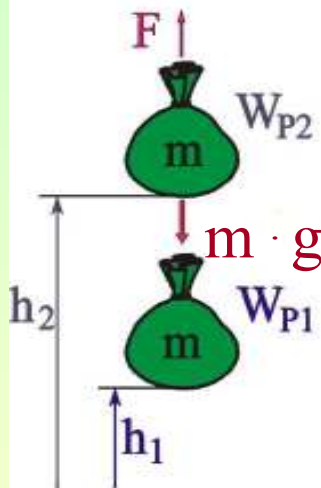
c (Ws/kg · K) , m (kg),

ΔT (K)

Varovanje električnih krogov pred kratkimi stiki in preobremenitvami s taljivimi varovalkami.



MEHANSKO DELO ELEKTRIČNEGA TOKA



$$W_{\text{meh}} = W_{P2} - W_{P1}$$

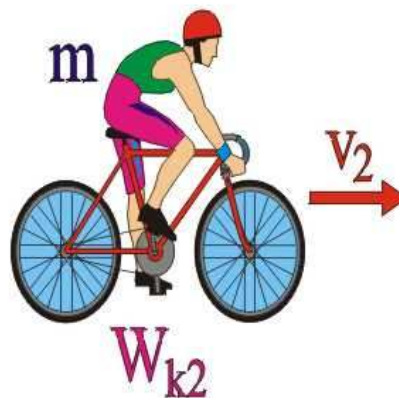
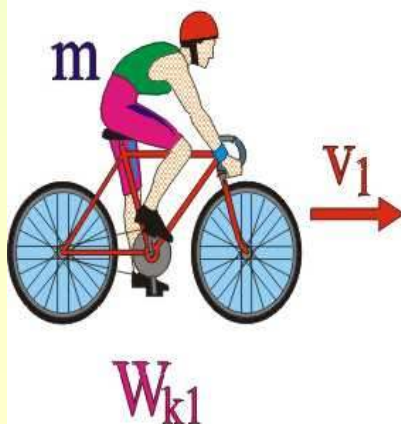
$$W_{\text{meh}} = mgh_2 - mgh_1$$

$$W_{\text{meh}} = mg(h_2 - h_1) \text{ [Nm]}$$

$$m \text{ [kg]} \quad g \text{ [m/s}^2\text{]} \quad h \text{ [m]}$$

Mehansko delo je vzrok ali posledica spremembe potencialne ali kinetične energije telesa.

$$W_m = F \cdot s \Rightarrow P_m = F \cdot v$$



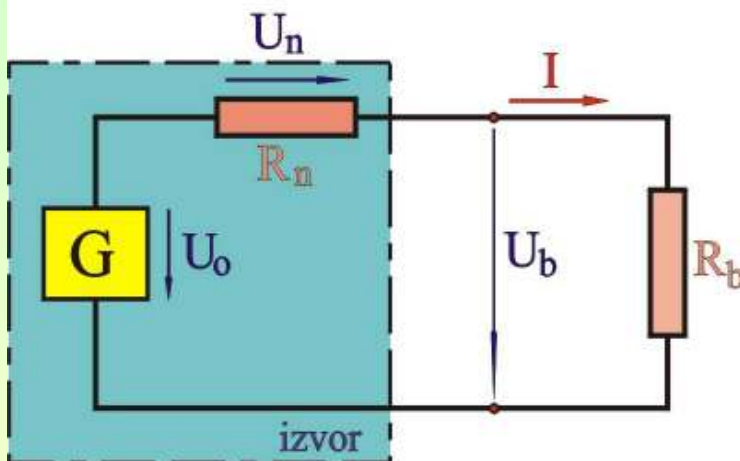
$$W_{\text{meh}} = W_{k2} - W_{k1}$$

$$W_{\text{meh}} = \frac{mv_2^2}{2} - \frac{mv_1^2}{2}$$

$$W_{\text{meh}} = \frac{m}{2} (v_2^2 - v_1^2) \text{ [Nm]}$$

$$m \text{ [kg]} \quad v \text{ [m/s]}$$

RAZPOLOŽLJIVA MOČ IZVORA



$$I = U_0 / (R_n + R_b)$$

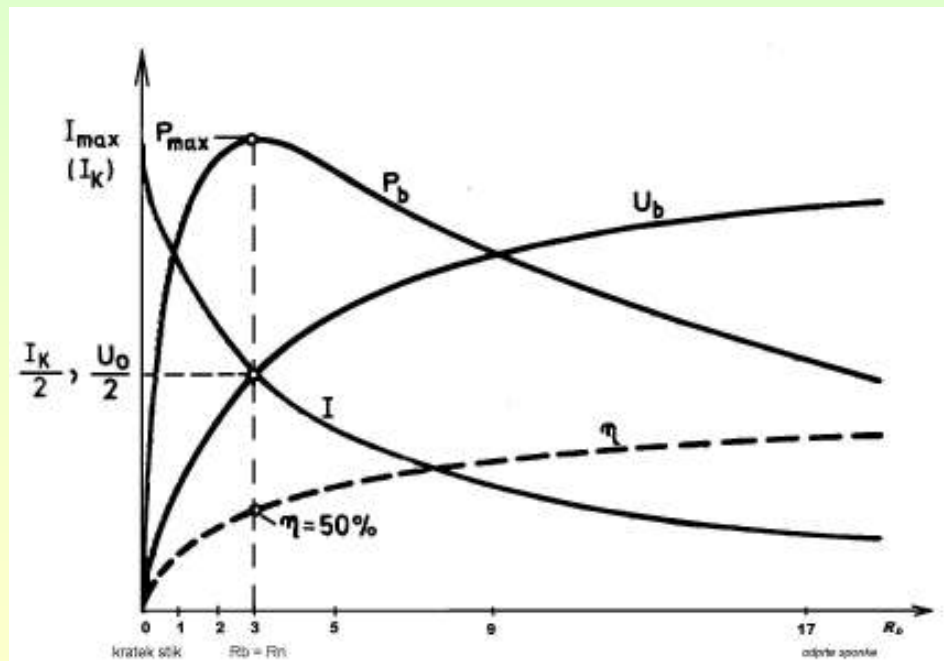
$$P_0 = I \cdot U_0$$

$$U_b = I \cdot R_b$$

$$P_b = I \cdot U_b$$

$$\eta = P_b / P_0$$

Odvisnost napetosti in moči na bremenu od upornosti bremena.



Kdaj ima porabnik največjo moč?

Primer: $U_0 = 12 \text{ V}$, $R_n = 3 \Omega$