z. 25.10, s. 118

Dane:

$U_p = 230V$

$P_p = 650W$

$U_j = 100V$

a) $P = UJ$

$J = \frac{U}{R}$

$P = U \cdot \frac{U}{R}$

$P = \frac{U^2}{R} \quad / \cdot R$

$PR = U^2$

$R = \frac{U^2}{P}$

$R = \frac{U_p^2}{P_p} = \frac{U_j^2}{P_j}$

$\frac{U_p^2}{P_p} = \frac{U_j^2}{P_j} \quad / \cdot P_j P_p$

$U_p^2 P_j = U_j^2 P_p \quad / : U_p^2$

$P_j = \frac{U_j^2}{U_p^2} P_p$

$P_j = \frac{(100V)^2}{(230V)^2} \cdot 650W = \frac{10000V^2}{52900V^2} \cdot 650W \approx$

$\approx 0,189 \cdot 650W \approx \underline{123W}$

b) $J_j U_j = P_j$

$J_j U_j = \frac{U_j^2}{U_p^2} P_p$

$J_j = \frac{U_j}{U_p^2} P_p$

$J_j = \frac{J_{0.j}}{\sqrt{2}} \quad / \cdot \sqrt{2}$

$J_j \sqrt{2} = J_{0.j}$

$J_{0.j} = \frac{U_j}{U_p^2} P_p \sqrt{2}$

$J_{0.j} = \frac{U_j P_p \sqrt{2}}{U_p^2}$

$J_{0.j} = \frac{100V \cdot 650W \cdot \sqrt{2}}{2 \cdot (230V)^2} \approx \underline{1,74A}$

c) $E = P_p t_p$

$E = P_j t_j$

$P_j t_j = P_p t_p \quad / : P_j t_p$

$\frac{t_j}{t_p} = \frac{P_p}{P_j}$

$\frac{t_j}{t_p} = \frac{P_p}{\frac{U_j^2}{U_p^2} P_p}$

$\frac{t_j}{t_p} = \frac{U_p^2}{U_j^2}$

$\frac{t_j}{t_p} = \frac{(230V)^2}{(100V)^2} \approx 5$

Odp.: W Japonii zagotowanie wody będzie trwało około 5 razy dłużej.