

①

$U_n = ?$

$P = 10 \text{ MW}$

$I = 180 \text{ A}$

$\cos \varphi = 0,9$

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 U_L, U_f

ICTAS 2018

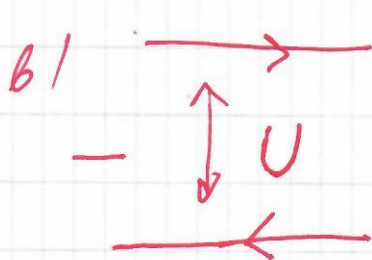
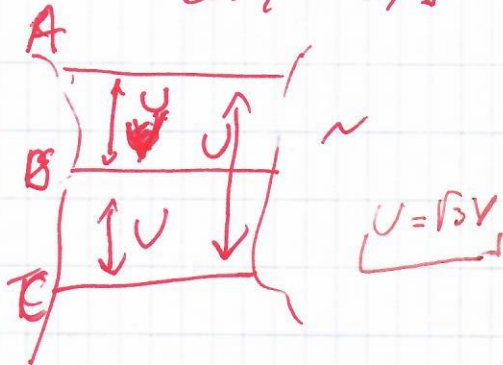
a) $P_{\text{eff}} = V I \cos \varphi \Rightarrow$

$V = P / I \cos \varphi$

$V = 10 \cdot 10^6 / 180 \cdot 0,9 = 61,728 \text{ kV}$

$U = \sqrt{3} V = 106,79 \text{ kV}$

$U_n = 110 \text{ kV}$



$U_n = ?$

$P = 20 \text{ MW}$

$I = 200 \text{ A}$

$P = UI$

$U = P / I = \frac{20 \cdot 10^6}{200} = 100 \text{ kV}$

2.1 a-

$I = ?$

a) $P = UI$

$I = P / U = \frac{110 \cdot 10^6}{220 \cdot 10^3}$

② $P = 110 \text{ MW}$

$l = 100 \text{ km}$

a) $U = 220 \text{ kV}$

b) $U = 220 \text{ kV}$

b) $P = \sqrt{3} \cdot U \cdot I \cos \varphi$

$\Rightarrow I = \frac{P}{\sqrt{3} U \cos \varphi} = \frac{110 \cdot 10^6}{\sqrt{3} \cdot 220 \cdot 10^3 \cdot 0,9}$

$I = 500 \text{ A}$

$I = 320,75 \text{ A}$

2.2

$R = \frac{\rho l}{S} = \frac{0,028 \frac{\mu\text{m}^2}{\text{m}} \cdot 100 \cdot 10^3 \text{ m}}{243 \text{ mm}^2}$

$R = 11,522 \Omega$

2.3

" $\Delta P = 2RI^2 = 2 \cdot 11,522 \cdot 500^2 = 5761 \text{ kW}$ $\Delta P\% = \frac{\Delta P}{P} \cdot 100 = 5,237\%$

" $\Delta P_1 = RI^2 = 11,522 \cdot 320,75^2 = 1185,389 \text{ kW}$ $\Delta P = 3 \Delta P_1 = 3556,167 \text{ kW}$ $\frac{\Delta P}{P} = 3,23\%$