№ 9.1.1

$U_{ch} = U \cdot 3\% = 220 \cdot 3\% = 6{,}6 \text{ V}$

a) $U = U - U_{ch} = 225 - 6{,}6 = \underline{218{,}4 \text{ V}}$

$U_{ch} = U \cdot 5\% = 220 \cdot 5\% = 11 \text{ V}$

b) $U = U - U_{ch} = 225 - 11 = \underline{214 \text{ V}}$

№ 9.1.2

a) $U_{ch} = U - U = 225{,}2 - 219{,}4 = \underline{5{,}8 \text{ V}}$

b) $\% = \dfrac{5{,}8 \cdot 100}{220} = \underline{2{,}636 \%}$

№ 9.1.3

$R = \dfrac{\varphi \cdot l}{A} = \dfrac{0{,}0175 \cdot 2{,}8}{1{,}5} = 0{,}0326 \, \Omega$

a) $U = R \cdot I = 0{,}0326 \cdot 3{,}75 = \underline{122{,}5 \text{ mV}}$

b) $U\% = \dfrac{0{,}1225 \cdot 100}{12} = \underline{1{,}021 \%}$

№ 9.1.4

$R = \dfrac{\varphi \cdot l}{A} = \dfrac{0{,}0175 \cdot 5{,}3}{2{,}5} = 37{,}1 \text{ m}\Omega$

$U_{ch} = R \cdot I = 0{,}0371 \cdot 5{,}2 = 0{,}1929 \text{ V}$

$U = U + U_{ch} = 4{,}95 + 0{,}1929 = \underline{5{,}143 \text{ V}}$

№ 9.1.5

$R = \dfrac{U}{I} = \dfrac{1{,}72}{145} = \underline{11{,}86 \text{ m}\Omega}$

№ 9.1.6

$A = \phi^2 \cdot 0{,}785 = 0{,}6^2 \cdot 0{,}785 = 0{,}2826 \text{ mm}^2$

$R = \dfrac{\varphi \cdot l}{A} \cdot 2 = \dfrac{0{,}0175 \cdot 8210}{0{,}2826} \cdot 2 = 1016{,}8 \, \Omega$

a) $U_{ch} = R \cdot I = 1016{,}8 \cdot 0{,}005 = \underline{5{,}082 \text{ V}}$

b) $U = U - U_{ch} = 47{,}7 - 5{,}082 = \underline{42{,}62 \text{ V}}$

№ 9.1.7

a) $\quad U = U = \underline{36\ V}$

$R_{tot} = R + R_1 = 2 + (2 \cdot 0{,}158) = 2{,}316\ \Omega$

$I = \dfrac{U}{R} = \dfrac{36}{2{,}316} = 15{,}54\ A$

$U_{ch} = R_1 \cdot I = 2 \cdot 0{,}158 \cdot 15{,}54 = 4{,}91\ V$

b) $\quad U = U - U_{ch} = 36 - 4{,}91 = \underline{\underline{31{,}09\ V}}$

№ 9.1.8

$R = \dfrac{\varphi \cdot l}{A} \cdot 2 = \dfrac{0{,}0175 \cdot 55}{6} \cdot 2 = 0{,}32\ \Omega$

$U_{ch} = R \cdot I = 0{,}32 \cdot 21 = 6{,}7\ V$

a) $\quad U = U + U_{ch} = 218 + 6{,}7 = \underline{\underline{224{,}7\ V}}$

$U_{ch} = R \cdot I = 0{,}32 \cdot 38 = 12{,}16\ V$

b) $\quad U = U - U_{ch} = 224{,}73 - 12{,}16 = \underline{\underline{212{,}5\ V}}$

№ 9.2.1

$$R = \frac{\varphi \cdot l}{A} = \frac{0,0175 \cdot 21}{6} = 0,06125 \ \Omega$$

$$U_{ch} = R \cdot I = 0,06125 \cdot 58 = \underline{\underline{3,553 \ V}}$$

№ 9.2.2

$$A = \varphi^2 \cdot 0,785 = 4^2 \cdot 0,785 = 12,56 \ mm^2$$

$$R = \frac{\varphi \cdot l}{A} = \frac{0,0175 \cdot 8,2}{12,56} = 0,011 \ \Omega$$

$$U = R \cdot I = 0,0142 \cdot 288 = \underline{\underline{3,29 \ V}}$$

№ 9.2.3

$$A - l \cdot L = 6 \cdot 50 = 300 \ mm^2$$

$$R = \frac{\varphi \cdot l}{A} = \frac{0,029 \cdot 7,6}{300} = 0,734 \ m\Omega$$

a) $U = R \cdot I = 0,734 \cdot 450 = \underline{\underline{0,33 \ V}}$

b) $P = R \cdot I^2 = 0,734 \cdot 450^2 = \underline{\underline{148,63 \ W}}$

№ 9.2.4

$$A = \varphi^2 \cdot 0,795 = 4^2 \cdot 0,795 = 12,56 \ mm^2$$

$$R = \frac{\varphi \cdot l}{A} = \frac{0,075 \cdot 0,04}{12,56} = 238,7 \ \mu\Omega$$

a) $U = R \cdot I = 238,7 \cdot 25 = \underline{\underline{5,968 \ mV}}$

b) $P = R \cdot I^2 = 238,7 \cdot 25^2 = \underline{\underline{149,2 \ mW}}$

№ 9.2.5

a) $U_{ch.} = U - U = 224,3 - 220,9 = \underline{\underline{3,4 \ V}}$

b) $\% = \frac{3,4 \cdot 100}{220} = \underline{\underline{1,545 \ \%}}$

№ 9.2.6

a) $U = R \cdot I - 1,75 \cdot 6 = \underline{\underline{10,5 \ V}}$

b) $U = R \cdot I = 1,16 \cdot 10 = \underline{\underline{11,6 \ V}}$

c) $U = R \cdot I = 0,7 \cdot 16 = \underline{\underline{11,2 \ V}}$

d) $U = R \cdot I = 0,437 \cdot 20 = \underline{\underline{8,74 \ V}}$

N° 9.2.6 Suite !

e) $U = R \cdot I = 0,291 \cdot 25 = \underline{\underline{7,275\ V}}$

f) $U = R \cdot I = 0,175 \cdot 40 = \underline{\underline{7\ V}}$

g) $U = R \cdot I = 0,1093 \cdot 63 = \underline{\underline{6,885\ V}}$

N° 9.2.7

a) $U_{ch.} = R \cdot 2 \cdot I = 0,12 \cdot 2 \cdot 9,6 = \underline{\underline{2,304\ V}}$

b) $U = U + U_{ch} = 220 + 2,304 = \underline{\underline{222,304\ V}}$

N° 9.2.8

$R_t = R_1 + R_2 + R_3 = 0,12 + 10,6 + 0,12 = 10,84\ \Omega$

$I = \dfrac{U}{R} = \dfrac{223}{10,84} = 20,57\ A$

$U = R \cdot I = 10,6 \cdot 20,57 = \underline{\underline{218,06\ V}}$

N° 9.2.9

$U_{ch} = U_1 - U_2 = 226 - 219 = 7\ V$

$R = \dfrac{U_{ch}}{I} = \dfrac{7}{18,2} = \underline{\underline{384,6\ m\Omega}}$

N° 9.2.10

$R = \dfrac{U^2}{P} = \dfrac{48^2}{1200} = 1,92\ \Omega$

$R_l = \dfrac{\varrho \cdot l}{A} \cdot 2 = \dfrac{0,0175 \cdot 28,5}{10} \cdot 2 = 0,09975\ \Omega$

$R_t = R + R_l = 1,92 + 0,09975 = 2,01975\ \Omega$

$I = \dfrac{P}{U} = \dfrac{1200}{48} = 25\ A$

$U_t = R_t \cdot I = 2,019 \cdot 25 = \underline{\underline{50,49\ V}}$

N° 9.2.11

$R_l = \dfrac{\varrho \cdot l}{A} \cdot 2 = \dfrac{0,0175 \cdot 110}{2,5} \cdot 2 = 1,54\ \Omega$

$R_t = R_1 + R_l = 60 + 1,54 = 61,54\ \Omega$

$I = \dfrac{U}{R} = \dfrac{222}{61,54} = 3,6\ A$

a) $U R_1 = R_1 \cdot I = 60 \cdot 3,6 = \underline{\underline{216,44}} \; V$

$R_e = \dfrac{1}{\dfrac{1}{R_1} + \dfrac{1}{R_{2J}}} = \dfrac{1}{\dfrac{1}{60} + \dfrac{1}{80}} = 34,285 \; \Omega$

$R_t = R_e + R_1 = 34,285 + 1,54 = 35,825 \; \Omega$

$I = \dfrac{U}{R} = \dfrac{222}{35,82} = 6,196 \; A$

b) $U = R_e \cdot I = 34,285 \cdot 6,196 = \underline{\underline{212,55}} \; V$

$R_e = \dfrac{1}{\dfrac{1}{R_1} + \dfrac{1}{R_{2J}} + \dfrac{1}{R_3}} = \dfrac{1}{\dfrac{1}{60} + \dfrac{1}{80} + \dfrac{1}{100}} = 25,53 \; \Omega$

$R_t = R_e + R_1 = 25,53 + 1,54 = 27,07 \; \Omega$

$I = \dfrac{U}{R} = \dfrac{222}{27,07} = 8,2 \; A$

c) $U = R_e \cdot I = 25,53 \cdot 8,2 = \underline{\underline{209,38}} \; V$

$R_1 = \dfrac{\varphi \cdot l}{A} \cdot 2 = \dfrac{0,0175 \cdot 82}{4} \cdot 2 = 0,7175 \; \Omega$

$R_2 = \dfrac{\varphi \cdot l}{A} \cdot 2 = \dfrac{0,0175 \cdot 50}{2,5} \cdot 2 = 0,7 \; \Omega$

$R_t = R_1 + R_2 = 0,7175 + 0,7 = 1,4175 \; \Omega$

a) $U_{ch1} = R \cdot I = 1,41 \cdot 20 = 28,35 \; V$

b) $U_{ch2} = R \cdot I = 1,41 \cdot 10 = 14,175 \; V$

a) $U = U - U_{ch1} = 224 - 28,35 = \underline{\underline{195,65}} \; V$

b) $U = U - U_{ch2} = 224 - 14,175 = \underline{\underline{204,845}} \; V$

$A = \varphi^2 \cdot 0,785 = 0,6^2 \cdot 0,785 = 0,2826 \; mm^2$

$R = \dfrac{\varphi \cdot l}{A} \cdot 2 = \dfrac{0,0175 \cdot 100}{0,2826} \cdot 2 = 12,385 \; \Omega$

$U_{ch1} = U_{ch 2,3,4} = R \cdot I = 12,38 \cdot 0,2 = 2,476 \; V$

$U_4 = U + U_{ch4} = 43,2 + 2,476 = \underline{\underline{45,67}} \; V$

$U_3 = U_4 + U_{ch3} = 45,67 + 2,476 = \underline{\underline{48,15}} \; V$

No 9.2.13 Suite

$U_2 = U_3 + U_{ch2} = 48,15 + 2,476 \quad = \underline{\underline{50,62\ V}}$

$U_1 = U_2 + U_{ch1} = 50,62 + 2,476 \quad = \underline{\underline{53,10\ V}}$

No 9.2.14

$R\ conducteur = \dfrac{\varphi \cdot \ell}{A} = \dfrac{0,0175 \cdot 100}{16} \quad = 0,109375\ \Omega$

$R\ell = \dfrac{\varphi \cdot \ell}{A} \cdot 2 = \dfrac{0,0175 \cdot 100}{16} \cdot 2 \quad = 0,21875\ \Omega$

a) $U = R\ell \cdot I = 0,109 \cdot 60 = \underline{\underline{6,56\ V}}$

b) $U = R\ell \cdot I = 0,218 \cdot 60 = \underline{\underline{13,125\ V}}$

c) $U_{ch} = R \cdot I \cdot \cos\varphi = 0,217 \cdot 60 \cdot 0,8 = \underline{\underline{10,5\ V}}$

d) $U = U - U_{ch} = 220 - 10,5 = \underline{\underline{209,5\ V}}$

No 9.2.15

$A' = \phi^2 \cdot 0,715 = 30^2 \cdot 0,715 = 706,5\ mm^2$

$A'' = \phi^2 \cdot 0,785 = 26^2 \cdot 0,785 = 530,66\ mm^2$

$A = A' - A'' = 706,5 - 530,66 = 175,84\ mm^2$

$R = \dfrac{\varphi \cdot \ell}{A} = \dfrac{0,0175 \cdot 25}{175,84} = 2,488\ m\Omega$

$U_{ch} = R \cdot I \cdot \cos\varphi = 2,488 \cdot 500 \cdot 0,85 = \underline{\underline{1,057\ V}}$

No 9.2.16

$R = \dfrac{\varphi \cdot \ell}{A} \cdot 2 = \dfrac{0,0175 \cdot 1750}{45} \cdot 2 = 644\ m\Omega$

a) $U = R \cdot I \cdot \cos\varphi = 0,644 \cdot 340 \cdot 0,75 = \underline{\underline{164,4\ V}}$

b) $U = \dfrac{U}{2} = \dfrac{164,4}{2} = \underline{\underline{82,2\ V}}$

No 9.2.17

$U_{ch} = R \cdot I \cdot \cos\varphi \Rightarrow R = \dfrac{U_{ch}}{I \cdot \cos\varphi} = \dfrac{6,75}{150 \cdot 0,75} = 0,06\ \Omega$

$R = \dfrac{\varphi \cdot \ell}{A} \cdot 2 \Rightarrow \varphi = \dfrac{R \cdot A}{\ell \cdot 2} = \dfrac{0,06 \cdot 70}{69,5 \cdot 2} = \underline{\underline{0,0302}}\ \dfrac{\Omega \cdot mm^2}{m}$

c'est de l'$\underline{\underline{Aldrey}}$

No 9.2.18

$$R = \frac{U^2}{P} = \frac{380^2}{12000} = 12,03 \ \Omega$$

$$I = \frac{P}{U} = \frac{12000}{380} = 39,473 \ A$$

$$A = \frac{\pi \cdot \phi^2}{4} = \frac{3,14 \cdot 6^2}{4} = 28,274 \ mm^2$$

$$R = \frac{\rho \cdot \ell \cdot 2}{A} \quad \frac{0,0175 \cdot 240 \cdot 2}{28,274} = 0,297089 \ \Omega$$

a) $U_{ch} = R \cdot I \cdot \cos\varphi = 0,297 \cdot 39,47 \cdot 0,8 = \underline{9,381 \ V}$

b) $U = U + U_{ch} = 380 + 9,381 = \underline{389,38 \ V}$

c) $\% = \frac{9,381 \cdot 100}{380} = \underline{2,469 \ \%}$

No 9.2.19

$$R = \frac{\rho \cdot \ell}{A} \cdot 2 = \frac{0,0175 \cdot 45}{1} \cdot 2 = \underline{1,575 \ \Omega}$$

a) $U_{ch} = R \cdot I \cdot \cos\varphi = 1,575 \cdot 13 \cdot 0,85 = \underline{17,4 \ V}$

b) $U = U - U_{ch} = 226 - 17,4 = \underline{208,6 \ V}$

c) $\% = \frac{17,4 \cdot 100}{220} = \underline{7,91 \ \%}$

No 9.2.20

$$R = \frac{\rho \cdot 1}{A} \cdot 2 = \frac{0,0175 \cdot 100}{6} \cdot 2 = 0,583 \ \Omega$$

a) $U_{ch} = U \cdot 2\% = 220 \cdot 2\% = 4,4 \ V$

$$I_{max} = \frac{U}{R \cdot \cos\varphi} = \frac{4,4}{0,583 \cdot 0,9} = 8,38 \ A$$

$$P_{max} = U \cdot I \cdot \cos\varphi = 220 \cdot 8,38 \cdot 0,9 = \underline{1,659 \ kW}$$

b) $U_{ch} = U \cdot 3\% = 220 \cdot 3\% = 6,6 \ V$

$$I_{max} = \frac{U}{R \cdot \cos\varphi} = \frac{6,6}{0,583 \cdot 0,9} = 12,57 \ A$$

$$P_{max} = U \cdot I \cdot \cos\varphi = 220 \cdot 12,57 \cdot 0,9 = \underline{2,489 \ kW}$$

N° 9.2.20 Suite

c) $U_{ch} = U \cdot 4\% = 220 \cdot 4\% = 8,8\,V$

$I_{max} = \dfrac{U}{R \cdot \cos\varphi} = \dfrac{8,8}{0,583 \cdot 0,9} = 16,76\,A$

$P_{max} = U \cdot I \cdot \cos\varphi = 220 \cdot 16,76 \cdot 0,9 = \underline{3,319\,kW}$

d) $U_{ch} = U \cdot 5\% = 220 \cdot 5\% = 11\,V$

$I_{max} = \dfrac{U}{R \cdot \cos\varphi} = \dfrac{11}{0,583 \cdot 0,9} = 20,95\,A$

$P_{max} = U \cdot I \cdot \cos\varphi = 220 \cdot 20,95 \cdot 0,9 = \underline{4,149\,kW}$

N° 9.2.21

$R = \dfrac{\rho \cdot l}{A} \cdot 2 = \dfrac{0,0175 \cdot 65}{1,5} \cdot 2 = 1,5166\,\Omega$

$U_2 = U - 4\% = 220 - 4\% = 211,2\,V$

$U_{ch} = U \cdot 4\% = 220 \cdot 4\% = 8,8\,V$

$I_{max} = \dfrac{U}{R \cdot \cos\varphi} = \dfrac{8,8}{1,5166 \cdot 0,8} = \underline{7,253\,A}$

№ 9. 3. 1

$U_{ch} = U_1 - U_2 = 392 - 384 = \underline{\underline{8\,V}}$

$U_{ch}\% = \dfrac{8 \cdot 100}{380} = \underline{\underline{2,1\%}}$

№ 9. 3. 2

$U_{ch} = U \cdot \sqrt{3} = 4,62 \cdot 1,73 = \underline{\underline{8,002\,V}}$

$U_{ch}\% = \dfrac{8,002 \cdot 100}{380} = \underline{\underline{2,106\,\%}}$

$U_2 = U_1 - U_{ch} = 3 \times 390 - 8 = \underline{\underline{3 \times 382\,V}}$

№ 9. 3. 3

$R = R \cdot \sqrt{3} = 0,4 \cdot 1,73 = 0,692\,\Omega$

$U_{ch} = R \cdot I = 0,692 \cdot 10 = \underline{\underline{6,928\,V}}$

$U_{ch}\% = \dfrac{6,928 \cdot 100}{380} = \underline{\underline{1,82\,\%}}$

№ 9. 3. 4

$R = \dfrac{\varphi \cdot l}{A} \cdot \sqrt{3} = \dfrac{0,0175 \cdot 80}{1,5} \cdot 1,73 = 1,616\,\Omega$

$P = U \cdot I \cdot \sqrt{3} \Rightarrow I = \dfrac{P}{U \cdot \sqrt{3}} = \dfrac{3900}{380 \cdot 1,73} = 5,92\,A$

$U_{ch} = R \cdot I = 1,616 \cdot 5,92 = \underline{\underline{9,57\,V}}$

№ 9.3. 5

$U_{ch} = U \cdot 3\% = \dfrac{380 \cdot 3}{100} = 11,4\,V$

$R = \dfrac{U_{ch}}{I} = \dfrac{11,4}{160} = 0,07125\,\Omega$

$R = \dfrac{\varphi \cdot l}{A} \cdot \sqrt{3} \Rightarrow l = \dfrac{R \cdot A}{\varphi \cdot \sqrt{3}} = \dfrac{0,07125 \cdot 16}{0,0175 \cdot 1,73} = \underline{\underline{37,61\,m}}$

№ 9.3.6

$I = \dfrac{P}{U \cdot \sqrt{3}} = \dfrac{5500}{380 \cdot 1,73} = 8,356\,A$

$R_l = \dfrac{\varphi \cdot l}{A} \cdot \sqrt{3} = \dfrac{0,0175 \cdot 55}{2,5} \cdot 1,73 = 0,666\,\Omega$

a) $U_{ch} = R \cdot I = 0,666 \cdot 8,356 = \underline{\underline{5,572\,V}}$

$$U_{ch} \% = \frac{5,572 \cdot 100}{380} = \underline{\underline{1,466 \%}}$$

b) $U_2 = U_1 - U_{ch} = 3 \times 386 - 5,572 = \underline{\underline{3 \times 380,42 \, V}}$

c) $P = R \cdot I^2 \cdot \sqrt{3} = 0,666 \cdot 8,356^2 \cdot 1.73 = \underline{\underline{80,66 \, W}}$

N° 9.3.7

$I_{max} = 25 \, A \quad pour \; 6 \, \#$

$U_{ch} = 380 \cdot 2\% = \frac{380 \cdot 2}{100} = \underline{\underline{7,6 \, V}}$

$R = \frac{U}{I} = \frac{7,6}{25} = 0,304 \, \Omega$

$R = \frac{\rho \cdot \ell}{A} \cdot \sqrt{3} \Rightarrow \ell = \frac{R \cdot A}{\rho \cdot \sqrt{3}} = \frac{0,304 \cdot 6}{0,0175 \cdot 1.73} = \underline{\underline{60,176 \, m}}$

N° 9.3.8

$R = \frac{\rho \cdot \ell}{A} \cdot \sqrt{3} = \frac{0,0175 \cdot 320}{25} \cdot 1,73 = 0,3879 \, \Omega$

$R = \frac{\rho \cdot \ell \cdot \sqrt{3}}{A} = \frac{0,029 \cdot 320}{35} \cdot 1.73 = 0,4592 \, \Omega$

$I = \frac{P}{u \cdot \sqrt{3}} = \frac{22000}{380 \cdot 1.73} = 33,42 \, A$

$U_{ch} = R \cdot I = 0,3879 \cdot 33,42 = \underline{\underline{12,96 \, V}}$

$U_{ch} \% = \frac{12,96 \cdot 100}{380} = \underline{\underline{3,41 \%}}$

$U_{ch} = R \cdot I = 0,4592 \cdot 33,42 = \underline{\underline{15,34 \, V}}$

$U_{ch} \% = \frac{15,34 \cdot 100}{380} = \underline{\underline{4,038 \%}}$

N° 9.3.9

$R\ell = R \cdot \sqrt{3} = 0,24 \cdot 1.73 = 0,415 \, \Omega$

a) $U_{ch} = R \cdot I \cdot \cos \varphi = 0,4156 \cdot 28 \cdot 0.75 = \underline{\underline{8,729 \, V}}$

$U_{ch} \% = \frac{8,729 \cdot 100}{380} = \underline{\underline{2,297 \%}}$

b) $U_2 = U_1 - U_{ch} = 3 \times 390 - 8,729 = \underline{\underline{3 \times 381,27 \, V}}$

№ 9.3.10

$R_l = \dfrac{P \cdot l}{A} \cdot \sqrt{3} = \dfrac{0,033 \cdot 1400}{240} \cdot 1,73 = 0,3534 \ \Omega$

a) $U_{ch} = R \cdot I \cdot \cos \varphi = 0,33 \cdot 400 \cdot 0,91 = \underline{\underline{121,36 \ V}}$

b) $U_2 = U_1 + U_{ch} = 50100 + 121,36 = \underline{\underline{3 \times 50{,}221 \ kV}}$

№ 9.3.11

$I = \dfrac{P}{U \cdot \sqrt{3} \cdot \cos \varphi} = \dfrac{36000}{380 \cdot 1,73 \cdot 0,82} = 66,7 \ A$

$R_l = \dfrac{P \cdot l}{A} \cdot \sqrt{3} = \dfrac{0,0175 \cdot 32}{16} \cdot 1,73 = 0,0606 \ \Omega$

$U_{ch} = R \cdot I \cdot \cos \varphi = 0,0606 \cdot 66,7 \cdot 0,82 = 3,31 \ V$

$U_2 = U_1 - U_{ch} = 3 \times 395 - 3,31 = \underline{\underline{3 \times 391,7 \ V}}$

№ 9.3.12

$A = \phi^2 \cdot 0,785 = 6^2 \cdot 0,785 = 28,26 \ mm^2$

$R_l = \dfrac{P \cdot l}{A} \cdot \sqrt{3} = \dfrac{0,0175 \cdot 2600}{28,26} \cdot 1,73 = 2,788 \ \Omega$

$U_{ch} = R \cdot I \cdot \cos \varphi = 2,788 \cdot 90 \cdot 0,88 = \underline{\underline{220,85 \ V}}$

№ 9.3.13

$P = U \cdot I \cdot \sqrt{3} \cdot \cos \varphi \cdot n \Rightarrow I = \dfrac{P}{U \cdot \sqrt{3} \cdot \cos \varphi \cdot n} = \dfrac{12000}{500 \cdot 1,73 \cdot 0,85 \cdot 0,8} = 20,377 \ A$

$R_l = \dfrac{P \cdot l}{A} \cdot \sqrt{3} = \dfrac{0,0175 \cdot 80}{6} \cdot 1,73 = 0,403 \ \Omega$

a) $U_{ch} = R \cdot I \cdot \cos \varphi = 20,377 \cdot 0,403 \cdot 0,85 = \underline{\underline{7 \ V}}$

$U_{ch}\% = \dfrac{7}{500} \cdot 100 = \underline{\underline{1,4 \ \%}}$

b) $U_1 = U_2 + U_{ch} = 500 + 7 = \underline{\underline{507 \ V}}$

№ 9.3.14

$P = U \cdot \sqrt{3} \cdot \cos \varphi \cdot n \Rightarrow I = \dfrac{P}{U \cdot \sqrt{3} \cdot \cos \varphi \cdot n} = \dfrac{20000}{380 \cdot 1,73 \cdot 0,86 \cdot 0,85} = 41,57 \ A$

$R_l = \dfrac{P \cdot l}{A} \cdot \sqrt{3} = \dfrac{0,0175 \cdot 120}{35} \cdot 1,73 = 0,1039 \ \Omega$

a) $U_{ch} = R \cdot I \cdot \cos \varphi = 0,1039 \cdot 41,57 \cdot 0,86 = \underline{\underline{3,715 \ V}}$

b) $U_{ch} = U_{ch} \cdot 5 = 3,715 \cdot 5 = \underline{\underline{18,57 \ V}}$

N° 9.3.15

$I = \dfrac{P}{U \cdot \sqrt{3} \cdot \cos \varphi \cdot n} \cdot 5 = \dfrac{25000}{380 \cdot 1,73 \cdot 0,86 \cdot 0,87} \cdot 5 = 253,84 \ A$

$U_{ch} = \dfrac{380 \cdot 5}{100} = 19 \ V$

$R_l = \dfrac{U_{ch}}{I \cdot \cos \varphi} = \dfrac{19}{253,84 \cdot 0,86} = 0,087 \ \Omega$

$R = \dfrac{\varphi \cdot l}{A} \cdot \sqrt{3} \Rightarrow l = \dfrac{R \cdot A}{\varphi \cdot \sqrt{3}} = \dfrac{0,087 \cdot 50}{0,0175 \cdot 1,73} = \underline{\underline{143,57 \ m}}$

N° 9. 3. 16

$I = \dfrac{P}{U \cdot \sqrt{3} \cdot \cos \varphi \cdot n} = \dfrac{11000}{380 \cdot 1,73 \cdot 0,85 \cdot 0,86} = 22,86 \ A$

$A = \phi^2 \cdot 0,785 = 4^2 \cdot 0,785 = 12,56 \ mm^2$

$R_l = \dfrac{\varphi \cdot l}{A} \cdot \sqrt{3} = \dfrac{0,0175 \cdot 800}{12,56} \cdot 1,73 = 1,93 \ \Omega$

$U_{ch} = R \cdot I \cdot \cos \varphi = 1,93 \cdot 22,86 \cdot 0,85 = 37,5 \ V$

a) $U_2 = U_1 - U_{ch} = 3 \times 395 - 37,5 = \underline{\underline{3 \times 357,5 \ V}}$

b) $U_{ph} = \dfrac{U}{\sqrt{3}} = \dfrac{357,5}{1,73} = \underline{\underline{206,4 \ V}}$