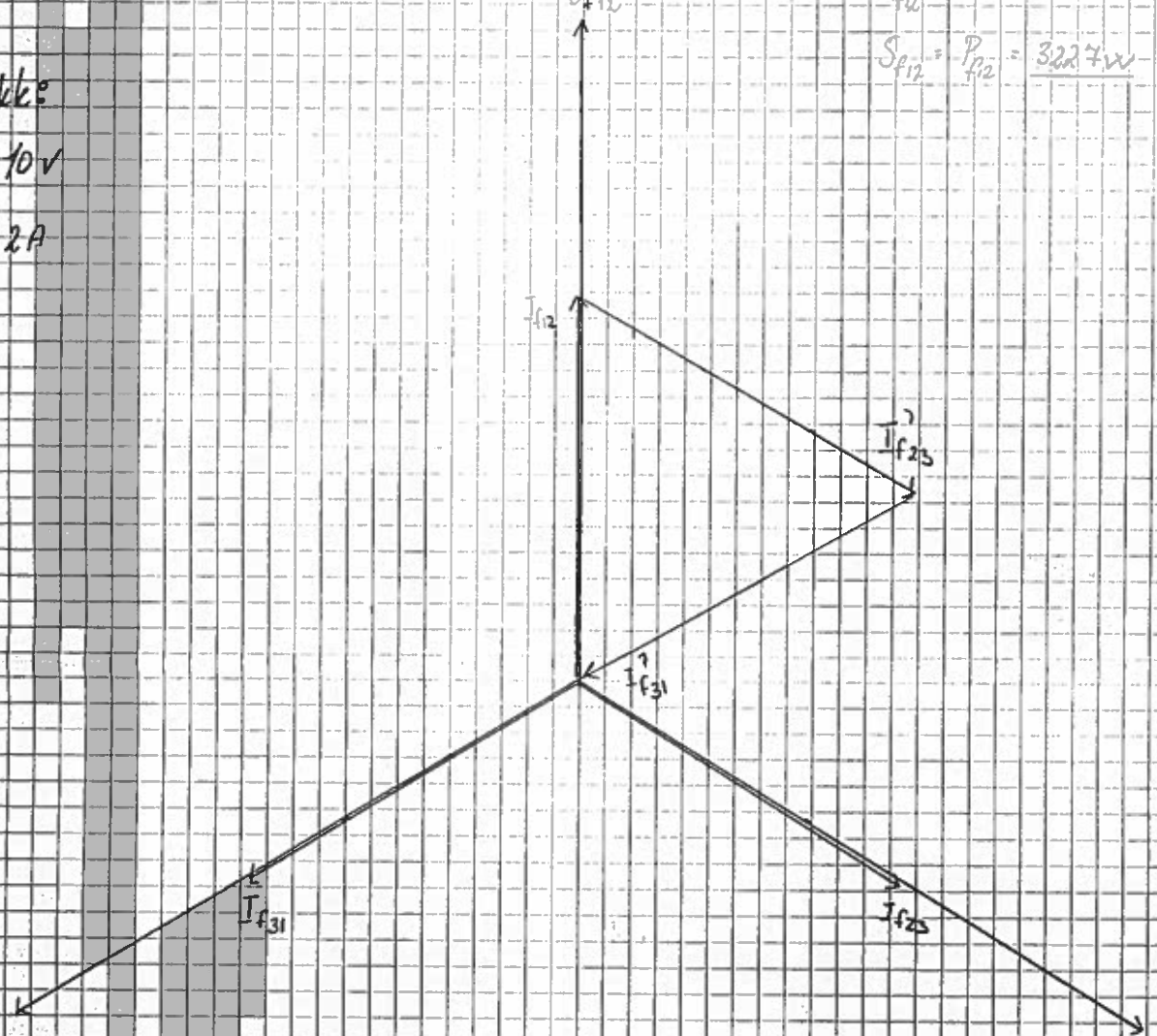
Oppg. 4.1

Målestokk:

$U_{cm} = 10\,V$

$I_{cm} = 2\,A$



a) $I_{f12} = \frac{U_{f12}}{R_{f12}} = \frac{220\,V}{15\,\Omega} = \underline{14{,}67\,A}$

$P_{f12} = U_{f12} \cdot I_{f12} = 220\,V \cdot 14{,}67\,A = \underline{3227\,W}$

$Q_{f12} = 0$

$S_{f12} = P_{f12} = \underline{3227\,W}$

b) $I_{f31} = I_{f12} = \underline{14{,}67\,A}$

$P_{f31} = P_{f12} = \underline{3227\,W}$

$S_{f31} = S_{f12} = \underline{3227\,VA}$

a) $I_{f23} = I_{f12} = \underline{14{,}67\,A}$

$P_{f23} = P_{f12} = \underline{3227\,W}$

$S_{f23} = S_{f12} \quad \underline{3227\,VA}$

Totale effekter:

$P = P_{f12} + P_{f23} + P_{f31} = 3227\,W + 3227\,W + 3227\,W = \underline{9682\,W}$

$Q = \underline{0}$

$S = P = \underline{9682\,VA}$

(9682 W)

eller

$P = \sqrt{3} \cdot U \cdot I = \sqrt{3} \cdot 380\,V \cdot 14{,}67\,A = \underline{9655\,W}$

8.4.2

stokk:

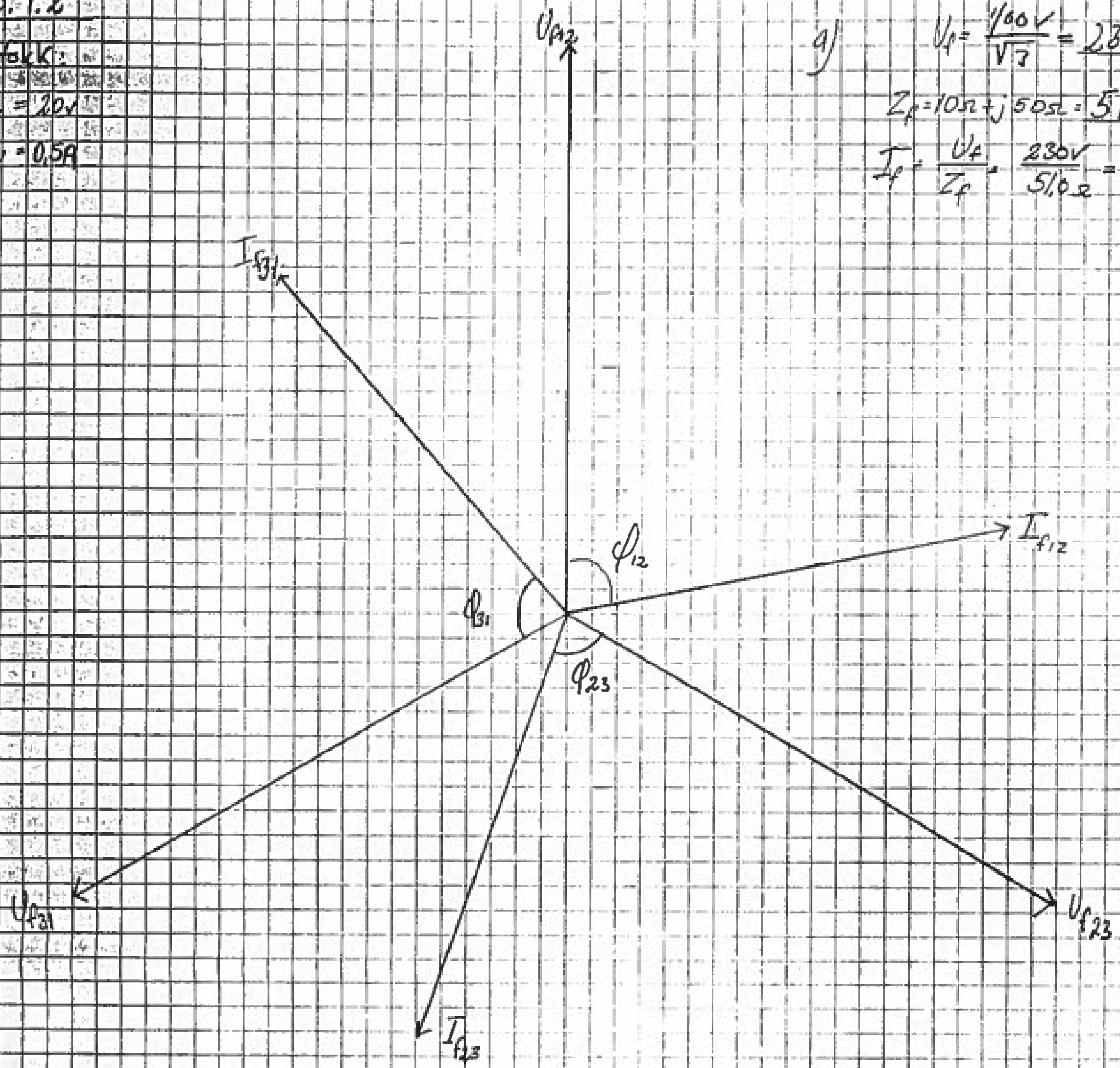
= 20V

= 0,5A

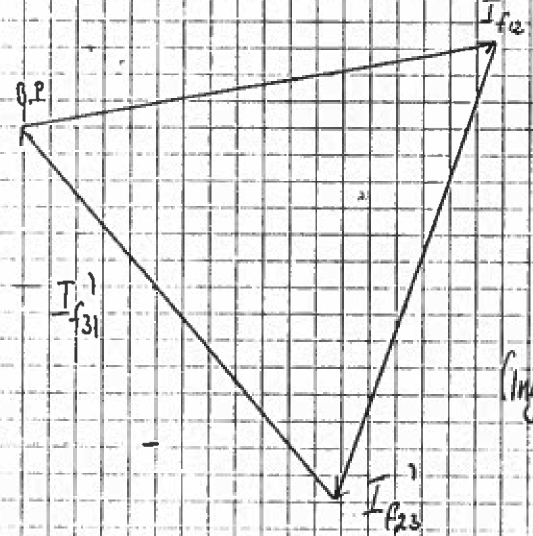
a) $U_f = \frac{400V}{\sqrt{3}} = \underline{230V}$

$Z_f = 10\Omega + j\,50\Omega = \underline{51{,}0\Omega \angle 78{,}7^\circ}$

$I_f = \frac{U_f}{Z_f} = \frac{230V}{51{,}0\Omega} = \underline{4{,}51A}$



b)



(Ingen strøm i nulleder)

Symmetri:

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

$P = \sqrt{3} \cdot 400V \cdot 4{,}51A \cdot \cos 78{,}7^\circ = \underline{612{,}3W}$

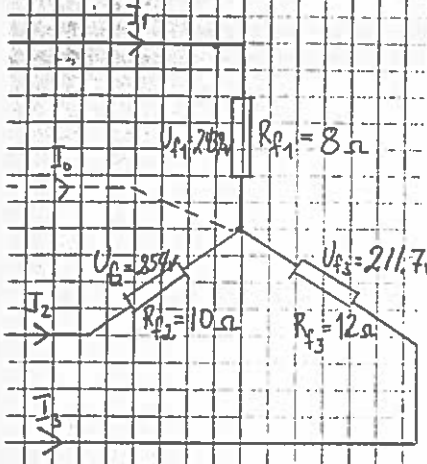
$S = \sqrt{3} \cdot U \cdot I$

$= \sqrt{3} \cdot 400V \cdot 4{,}51A = \underline{3124{,}6VA}$

$Q = \sqrt{3} \cdot U \cdot I \cdot \sin\varphi$

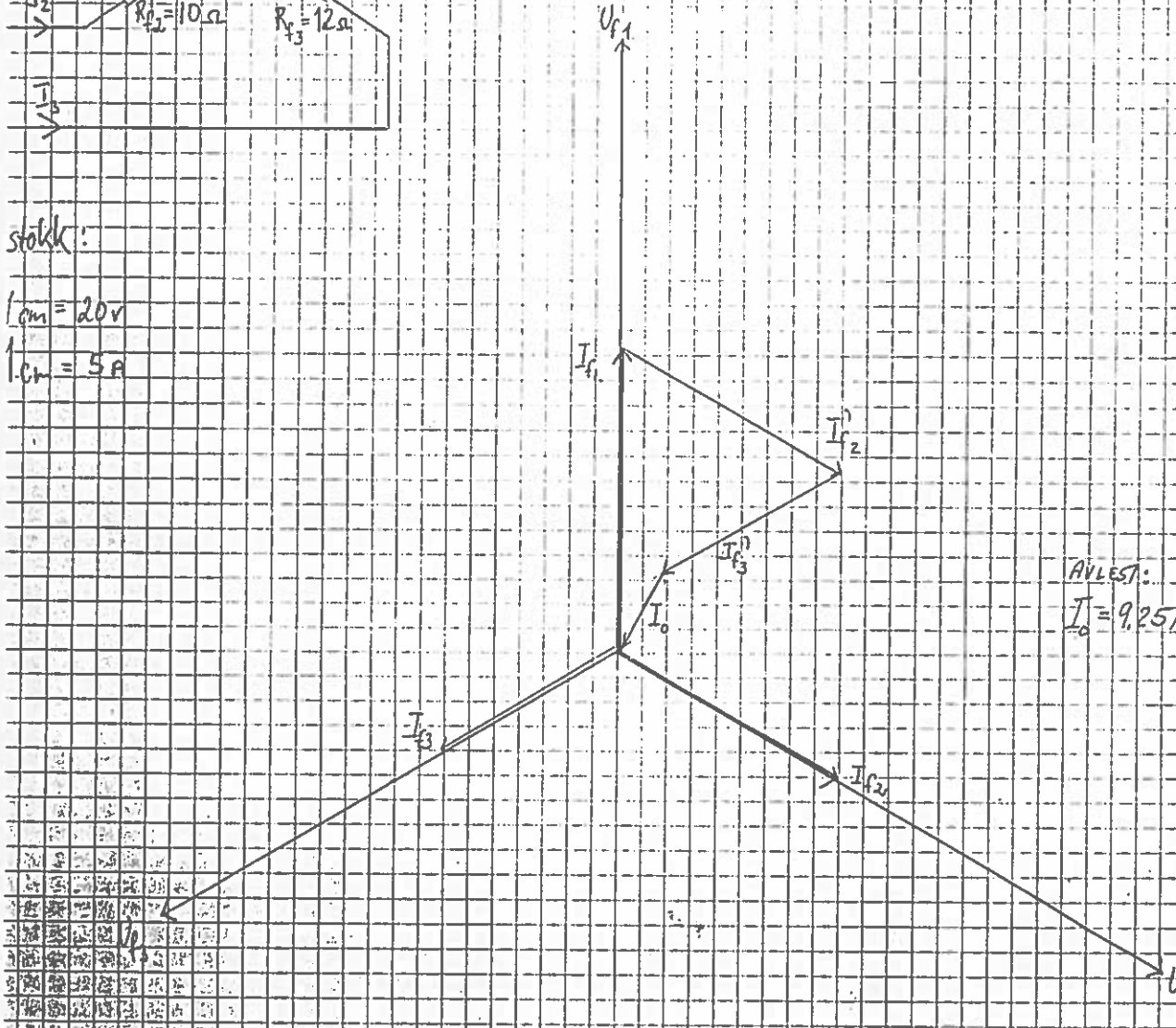
$Q = \sqrt{3} \cdot 400V \cdot 4{,}51A \cdot \sin 78{,}7^\circ = \underline{3064\,VAr}$

3.4.3



a) $I_{f1} = \frac{U_{f1}}{R_{f1}} = \frac{243{,}8\,V}{8\,\Omega} = \underline{30{,}4\,A}$

b) $P_{f1} = U_{f1} \cdot I_{f1} = 243{,}8\,V \cdot 30{,}4\,A = \underline{7412\,W}$



stokk:

1 cm = 20 V

1 cm = 5 A

AVLEST:

$I_0 = 9{,}25\,A$

g) $I_{f2} = \frac{U_{f2}}{R_{f2}} = \frac{254{,}0\,V}{10\,\Omega} = \underline{25{,}4\,A}$

h) $P_{f2} = U_{f2} \cdot I_{f2} = 254{,}0\,V \cdot 25{,}4\,A = \underline{6350\,W}$

$I_{f3} = \frac{U_{f3}}{R_{f3}} = \frac{211{,}7\,V}{12\,\Omega} = \underline{17{,}6\,A}$

$P_{f3} = U_{f3} \cdot I_{f3} = 211{,}7\,V \cdot 17{,}6\,A = \underline{3734\,W}$

$P = P_{f1} + P_{f2} + P_{f3} = 7412\,W + 6350\,W + 3734\,W = 17497\,W = \underline{17{,}5\,kW}$

8.4

Målestokk:
1 cm = 20 V
1 cm = 0,5 A

Fase-effekter:

a) $\underline{Z}_{f1} = 48\Omega + j64\Omega = 80\Omega \angle 53,1°$

$I_{f1} = \frac{U_{f1}}{Z_{f1}} = \frac{216V}{80\Omega} = \underline{2,7A}$

c) $P_{f1} = U_{f1} \cdot I_{f1} \cdot \cos\varphi_1 = 216V \cdot 2,7A \cdot \cos 53,1° = \underline{350,2W}$

$S_{f1} = U_{f1} \cdot I_{f1} = 216V \cdot 2,7A = \underline{583,2VA}$

$Q_{f1} = U_{f1} \cdot I_f \cdot \sin\varphi_1 = 216V \cdot 2,7A \cdot \sin 53,1° = \underline{466,4VAr}$

$= P_{f1} + P_{f2} + P_{f3} = 350,2W + 1429,3W + 179,7W$

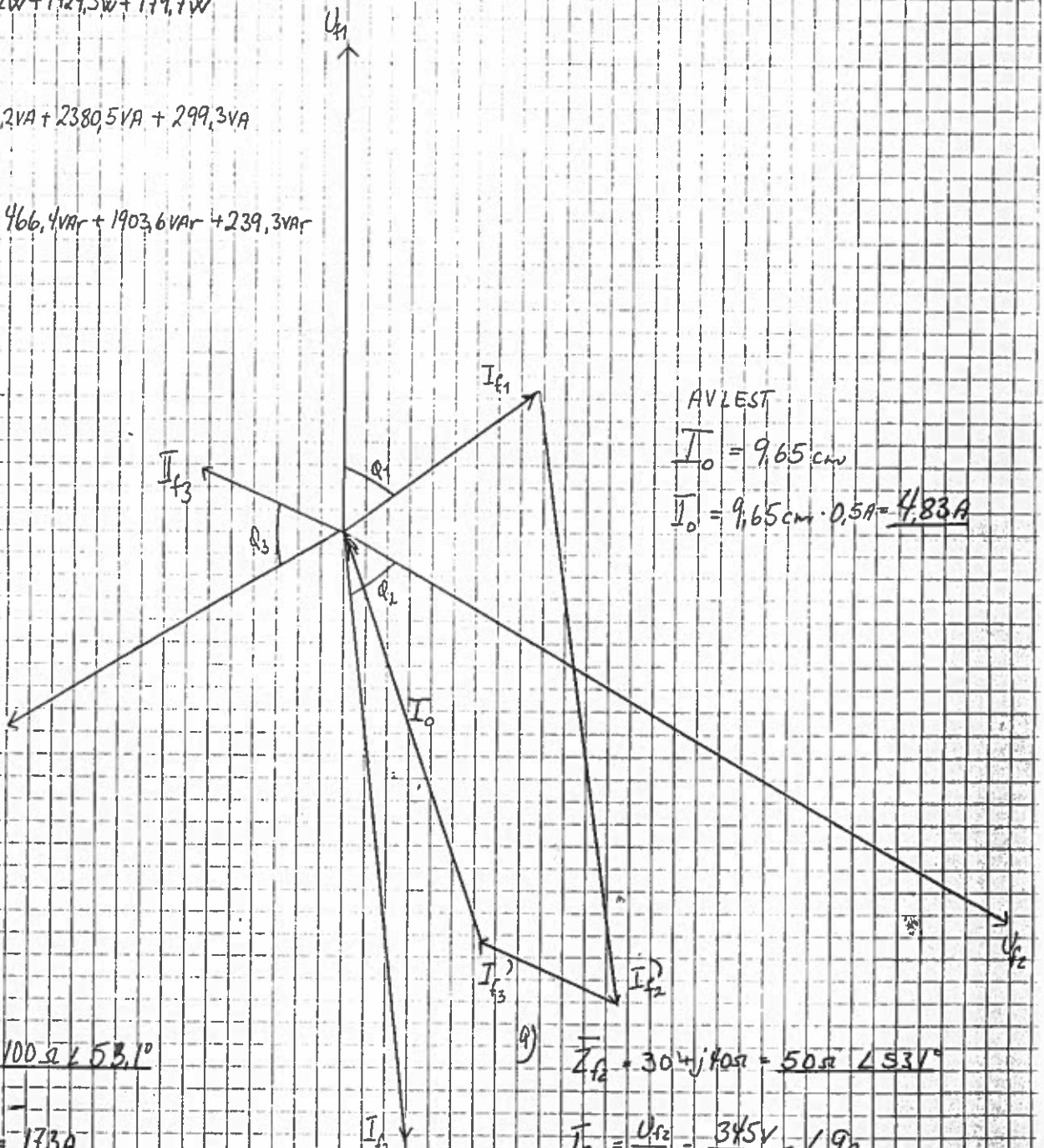
$= \underline{1959W}$

$= S_{f1} + S_{f2} + S_{f3} = 583,2VA + 2380,5VA + 299,3VA$

$= \underline{3263VA}$

$= Q_{f1} + Q_{f2} + Q_{f3} = 466,4VAr + 1903,6VAr + 239,3VAr$

$= \underline{2609VAr}$



AVLEST

$\underline{I}_0 = 9,65\,cm$

$\underline{I}_0 = 9,65\,cm \cdot 0,5A = \underline{4,83A}$

$\underline{Z}_{f3} = 60\Omega + j80\Omega = \underline{100\Omega \angle 53,1°}$

$I_{f3} = \frac{U_{f3}}{Z_{f3}} = \frac{173V}{100\Omega} = \underline{1,73A}$

$P_{f3} = U_{f3} \cdot I_{f3} \cdot \cos\varphi_3 = 173V \cdot 1,73A \cdot \cos 53,1° = \underline{179,7W}$

$S_{f3} = U_{f3} \cdot I_{f3} \cdot \cos\varphi_3 = 173V \cdot 1,73A = \underline{299,3VA}$

$Q_{f3} = U_{f3} \cdot I_{f3} \cdot \cos\varphi_3 = 173V \cdot 1,73A \cdot \cos 53,1° = \underline{239,3VAr}$

g) $\underline{Z}_{f2} = 30\Omega + j40\Omega = \underline{50\Omega \angle 53,1°}$

$I_{f2} = \frac{U_{f2}}{Z_{f2}} = \frac{345V}{50\Omega} = \underline{6,9A}$

e) $P_{f2} = U_{f2} \cdot I_{f2} \cdot \cos\varphi_2 = 345V \cdot 6,9A \cdot \cos 53,1° = \underline{1429,3W}$

$S_{f2} = U_{f2} \cdot I_{f2} = 345V \cdot 6,9A = \underline{2380,5VA}$

$Q_{f2} = U_{f2} \cdot I_{f2} \cdot \sin\varphi_2 = 345V \cdot 6,9A \cdot \sin 53,1° = \underline{1903,6VAr}$