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"Elektrijada 2012, oblast III, zadatak 2, maj 2012";
"ig(t)=√3/2 sinωt V, Pp=34 W, Abs(Qp)=34 VAR, Zc=96*√3 Ω, l1=λ/3, l2=λ/6.";
Element[{R>0, X>0}, Reals];
d1 =  $\frac{2 * \pi}{\lambda} * \frac{\lambda}{3}$ ;
d2 =  $\frac{2 * \pi}{\lambda} * \frac{\lambda}{6}$ ;
Zp1 = R - I * X;
Zp2 = R + I * X;
Zc = 96 * √3;
Ig =  $\frac{\sqrt{3}}{2}$ ;
Qp = 34;
Pp = 51;

Print["Ulazna impedansa potrosaca 1, Zp1u = ", Zp1u = Simplify[Zc *  $\frac{Zp1 * \text{Cos}[d1] + I * Zc * \text{Sin}[d1]}{I * Zp1 * \text{Sin}[d1] + Zc * \text{Cos}[d1]}$ ], ", "]
Print["Ulazna impedansa potrosaca 2, Zp2u = ", Zp2u = Simplify[Zc *  $\frac{Zp2 * \text{Cos}[d2] + I * Zc * \text{Sin}[d2]}{I * Zp2 * \text{Sin}[d2] + Zc * \text{Cos}[d2]}$ ], ", "]
Print["Ekvivalentna ulazna impedansa potrosaca, Z33pu = ", Z33pu = Simplify[ $\frac{Zp1u * Zp2u}{Zp1u + Zp2u}$ ], ". "]

Ulazna impedansa potrosaca 1, Zp1u =  $\frac{96 (288 + i R + X)}{R - i (-96 + X)}$ ,
Ulazna impedansa potrosaca 2, Zp2u =  $\frac{96 (288 - i R + X)}{R + i (-96 + X)}$ ,
Ekvivalentna ulazna impedansa potrosaca, Z33pu =  $\frac{R^2 + (288 + X)^2}{8 R}$ .

Print["Fazor napona na ulazu vodova, U33p = ", U33p = Simplify[Ig * Z33pu], " V."]

Fazor napona na ulazu vodova, U33p =  $\frac{\sqrt{3} (R^2 + (288 + X)^2)}{16 R}$  V.

Print["Iz odnosa snaga Pp2/Qp2 dobijamo: X = ", X = R *  $\frac{Qp}{Pp}$ ]
Print["Ukupna aktivna snaga potrosaca je: Pp12 = ", Pp12 = Simplify[Z33pu * Ig^2]]
RezR = Flatten[Solve[Pp12 == 2 * Pp, R]]

Iz odnosa snaga Pp2/Qp2 dobijamo: X =  $\frac{2 R}{3}$ 
Ukupna aktivna snaga potrosaca je: Pp12 =  $36 + \frac{7776}{R} + \frac{13 R}{96}$ 
{R →  $\frac{2592}{13}$ , R → 288}

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Print["Resenje sa vecom vrednoscu za par (R,X): R = ", R= Max[R/. RezR[[1]], R/. RezR[[2]]],  
      " Ω, X = ", X= Simplify[X], " Ω."]
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Resenje sa vecom vrednoscu za par (R,X): R = 288 Ω, X = 192 Ω.

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Print["Quvoda1 = ", Quvoda1= Im[Zp1u]*Abs[ $\frac{U33p}{Zp1u}$ ]2, " VAr."]
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Print["Qvoda1 = ", Qvoda1= Quvoda1+Qp, " VAr."]
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$Quvoda1 = \frac{119}{2} \text{ VAr.}$

$Qvoda1 = \frac{187}{2} \text{ VAr.}$