Sender

single phase

$$I = \frac{100\angle 0 - 100\angle -60}{100\angle 90} = 577\angle -30$$

$\theta_V - \theta_I$

$$P = VI\cos\theta$$

$$P_{S_{sender}} = (100kV)(577)(\cos 0 - -30)$$

$$= 86.6 \text{ MW}$$

$$Q_S = \sqrt{3}\,(100kV)(577)\sin 30$$

$$= 50 \text{ MVAR}$$

3phase

$$I = \frac{\frac{100\angle 0}{\sqrt{3}} - \frac{100\angle -60}{\sqrt{3}}}{100\angle 90}$$

$$= 1000\angle -30$$

$$P = \sqrt{3}\,VI\cos\theta$$

$$P_S = \sqrt{3}\,(100KV)(1000)(\cos 0 - -30)$$

$$= 86.6 \text{ MW}$$

Reciver

$$P_R = \sqrt{3}\,(1000\,KV)(1000A)\cos(-60 - -30)$$

$$= 86.6 \text{ MW}$$

$$Q_R = \sqrt{3}\,(1000KV)(577A)\sin(-60 - -30)$$

$$= -50 \text{ MVAR}$$

87MW →

50MVAR →

← 50 MVAR

[2]

$$I = \frac{\frac{100\angle 0}{\sqrt{3}} - \frac{120\angle -60}{\sqrt{3}}}{100\angle 90}$$

$$= 643\angle -69$$

$$P_S = \sqrt{3}(100KV)(643)\cos(0 - -69)$$

$$= 103 \text{ MW}$$

$$Q_S = \sqrt{3}(100\,KV)(643)(\sin(0 - -69)$$

$$= 40 \text{ MVAR}$$

Reciver

$$P_R = \sqrt{3}\,(120KV)(643)(\cos -60 - -69)$$

$$= 103 \text{ MW}$$

$$Q_R = \sqrt{3}\,(120KV)(643A)\sin -60 - -69)$$

$$= -84 \text{ MVAR}$$

100∠0 (S) —103MW→ (R) 120∠-60

40MVAR →

84MVAR ←

[3]

120∠0 (S) —87MW← (R) 100∠30

40MVAR →

4MVAR →