Lecture 24

2. **An alternating voltage of (80 + j60) V is applied to a circuit and the current flowing is (4 – j2) A. Find**
   (a) impedance
   (b) power consumed
   (c) phase angle
   (d) power factor

Solution

Data

$$\overline{V} = 80 + j60 \text{ V}$$
$$\overline{I} = 4 - j2 \text{ A}$$
$$\overline{Z} = \frac{\overline{V}}{\overline{I}} = \frac{80 + j60}{4 - j2} = \frac{100\angle36.87°}{4.47\angle-26.56°} = 22.37 \angle63.43° \; \Omega$$

Impedance $Z = 22.37 \; \Omega$
Phase angle $\phi = 63.43°$
Power factor $\text{pf} = \cos \phi = \cos (63.43°) = 0.447 \text{ (lagging)}$
Power consumed $P = VI \cos \phi$
$$= 100 \times 4.47 \times 0.447 = 199.81 \text{ W}$$