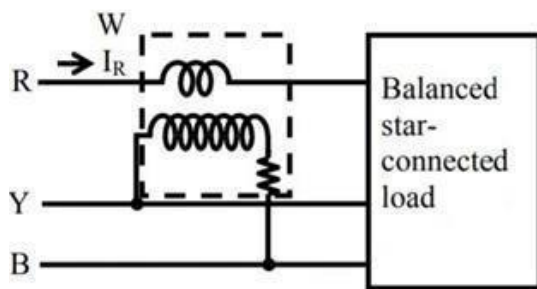


Lecture 50

1. Calculate the reading of the wattmeter (W) connected as shown in Fig below. The load is a balanced star-connected one, with impedance of $(20+j15) \Omega$ per phase, fed from a three-phase, 400 V, balanced supply, with the phase sequence as R-Y-B.



Solution:

Given $V_L = 400 \text{ V}$
 $Z_{ph} = (20 + j15) \Omega$

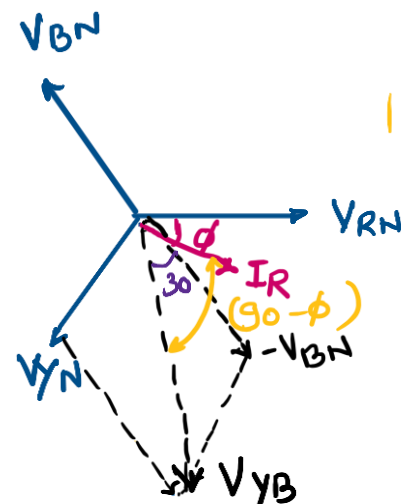
Current coil of wattmeter is connected in R line
 Potential coil of wattmeter is connected blⁿ Y & B line

\therefore Wattmeter reading W is given by

$$W = I_R V_{YB} \cos \angle I_R \& V_{YB}$$

$$\angle I_R \& V_{YB} = (90 - \phi)$$

$$\therefore W = V_L I_L \cos(90 - \phi)$$



Unit III: Assessment: Q & A (Selected)

$$Z_{ph} \angle \phi = 25 \angle 36.86^\circ, \quad I_{ph} = \frac{V_{ph}}{Z_{ph}}$$

In Star Connection,

$$V_L = \sqrt{3} V_{ph}, \quad I_L = I_{ph}$$

$$I_{ph} = \frac{230.94}{25} \\ = 9.23 \text{ A}$$

$$W = (400)(9.23) \cos(90 - 36.86) \\ = 2.214 \text{ kW}$$