Lecture 44

1. A balanced 3ϕ star connected load is supplied from a symmetrical 3ϕ 400V system. The current in each phase is 30A and lags by 30° behind the voltage. Find i) Impedance in each phase ii)total power drawn. Draw phasor diagram.

Solution:

Given $V_L = 400V$, $V_{ph} = 230.9V$

$I_{ph} = 30A$

$\phi = 30^\circ$, $\cos\phi = 0.866$ lag

Impedance $Z_{ph} = \frac{V_{ph}}{I_{ph}}$

$= \frac{230.9}{30}$

$Z_{ph} = 7.698\,\Omega$

Power $= \sqrt{3}\, V_L I_L \cos\phi$

$= \sqrt{3}\,(400)(30)\,0.866$

$= 18\,kW$