Lecture 48

2. A 3 phase motor operating on a 400 V supply is developing an output power of 25 HP at an efficiency of 87% and power factor of 0.82. calculate a) the line current and b) phase current, if the windings are delta connected

Solution:

Data Given $V_L = 400V$

$P_{out} = 25\ HP$

$\eta = 87\%$

$\cos\phi = 0.82$

$1\ HP = 746W$

$25\ HP = 18650$

$P_{out} = 18.65\ kW$

$$P_{in} = \frac{P_{out}}{\eta}$$

$$= \frac{18.65 \times 10^3}{0.87}$$

$$P_{in} = 21.43\ kW$$

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

$$I_L = \frac{21.43 \times 10^3}{\sqrt{3} \times 400 \times 0.82}$$

$$I_L = 37.72\ A$$

In Δ Connected System $I_L = \sqrt{3}\, I_{ph}$

$$I_{ph} = I_L/\sqrt{3} = 21.77\ A$$