

Q.6(f) A three-phase 400 V, 50Hz, a.c. supply is feeding a three phase [4]
 delta connected load with each phase having a resistance of 25
 ohms, an inductance of 0.15 H and a capacitance of 120
 microfarads in series. Determine the line current and total three
 phase power absorbed.

(A) $R = 25\Omega$, $X_L = 0.15 \text{ H}$, $X_C = 120 \mu\text{F}$

$$Z = \sqrt{R^2 + (X_L - X_C)^2} = \sqrt{625.022} = 25\Omega$$

$$V_{ph} = V_L = 400 \text{ V}$$

$$I_{ph} = \frac{V_{ph}}{Z} = \frac{400}{25} = 16 \text{ A}$$

$$I_L = \sqrt{3} I_{ph} = 27.7128 \text{ A}$$

Total three phase power absorbed.

$$\begin{aligned} P &= 3P_{ph} = 3 V_{ph} I_{ph} \cos \phi \\ &= 3(400)(16)(1) \\ &= 19200 \text{ W} \end{aligned}$$