Lecture -31

1.A parallel RC Circuit is connected across 200V, 50 Hz supply. If the supply **current and current in resistor are 10A & 6A respectively, determine**

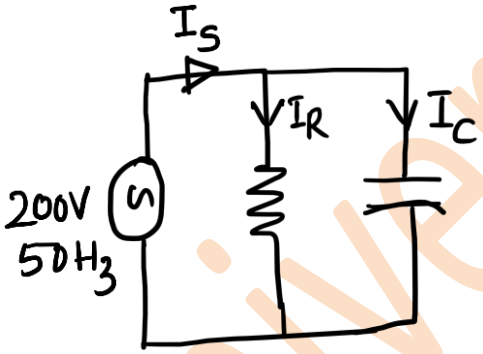
i) Current in capacitor

ii) Values of R & C

iii) Active, Reactive and Apparent Powers supplied by the source.

iv) Powerfactor of the network

Solution:



Supply current $I_S = 10A$

Current in Resistor $I_R = 6A$

$$I_S^2 = I_R^2 + I_C^2$$

Capacitor current $I_C = \sqrt{I_S^2 - I_R^2}$

$$= \sqrt{10^2 - 6^2}$$

$$I_C = 8A$$

Resistance $R = \frac{V}{I_R} = \frac{200}{6} = 33.33\Omega$

Reactance $X_C = \frac{V}{I_C} = \frac{200}{8} = 25\Omega$

Capacitor $C = \frac{1}{2\pi f X_C} = 127\ \mu F$

(iii) Active power $P = \frac{V^2}{R} = \frac{(200)^2}{33.33} = 1200.12\ W$

Reactive power $Q = \frac{-V^2}{X_C} = \frac{(200)^2}{25} = -1600\ VAR$

Apparent power $S = \sqrt{P^2 + Q^2}$

$= 2000.07\ VA$

Power factor of the Nw $\cos\phi = \frac{P}{S}$

$= 0.6$ Lead.