Lecture 27

1. A series RLC circuit draws a current of 20A when connected to 200V, 50Hz supply. If the total active power drawn from the source is 500W and the circuit behaves effectively like an inductive circuit (series RL type), determine
   i) Power factor of the circuit
   ii) Inductance in the circuit if Capacitance is 100μF

Solution:

Given, V = 200V , I = 20A & P = 500W

i) Since $P = I^2R$,

$R = 1.25\Omega$

$|Z| = \frac{V}{I} = 10\Omega$

Therefore, Power factor = $\frac{R}{|Z|} = 0.125$ Lag

ii) Net Reactance, $X = (X_L - X_C) = \sqrt{Z^2 - R^2} = 9.92\Omega$

$X_C = 31.83\Omega$

Hence, $X_L = 41.75\Omega$

Therefore, L = 132.89mH