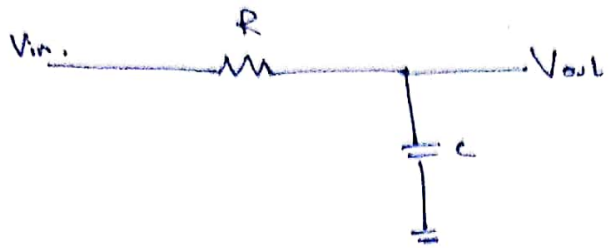
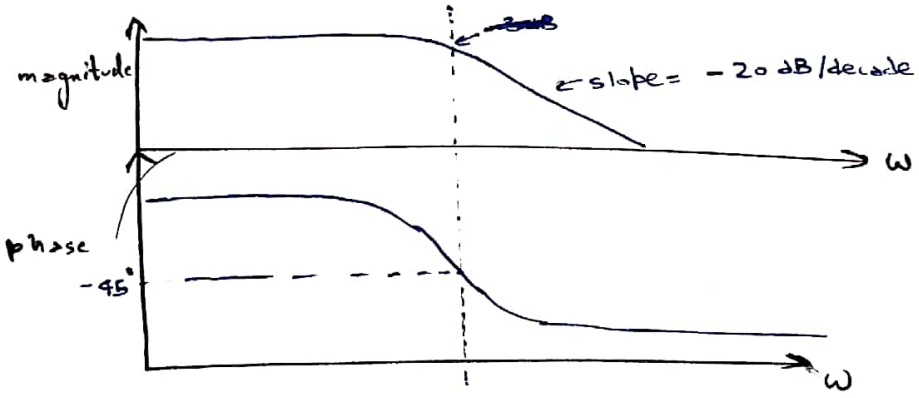
Low Pass Filter



$$H(j\omega) = \frac{1}{1+RCj\omega}$$

$$|H(j\omega)| = \frac{1}{\sqrt{1+R^2C^2\omega^2}}$$

$$\angle H(j\omega) = -\tan^{-1}(RC\omega)$$



∴ cutoff frequency ⇒ $-45^\circ = -\tan^{-1}(RC\omega_c)$

$$\therefore 1 = RC\omega_c$$

$$\text{or } 1 = RC\,2\pi f_c$$

$$\therefore f_c = \frac{1}{2\pi RC}$$

∴ If we are given a cutoff frequency, we can find R & C required for getting f_c