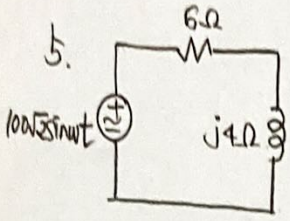
국방정보공학과 20200727106 송인경

회로이론 2 과제 4

5.



$V(t) = 100\sqrt{2}\sin\omega t = 100\sqrt{2}\cos(\omega t - 90°)$

$P_{avg} = \frac{1}{2}V_m I_m \cos(\theta - \phi)$

$I = \frac{V}{Z} = \frac{100\sqrt{2}\angle -90°}{6+j4} = 19.61\angle -123.69°$

$P_{avg} = \frac{1}{2}(I_m)^2 R = \frac{1}{2}\times(19.61)^2\times 6$

$= 1153.66[W]$

6. 100 V, 800 W, 역률 : 0.8 리액턴스?

① $P_{avg} = V_{eff} I_{eff}\cos\theta = 100\times 0.8\times I_{eff} = 800$

$I_{eff} = 10A$

② $P_a = V_{eff} I_{eff} = 100\times 10 = 1000$

③ $P_a^2 = P_{avg}^2 + Q^2$

$Q = \sqrt{P_a^2 - P_{avg}^2} = I_{eff}^2 X$

$= \sqrt{(1000)^2 - (800)^2} = 10^2 X = 600$

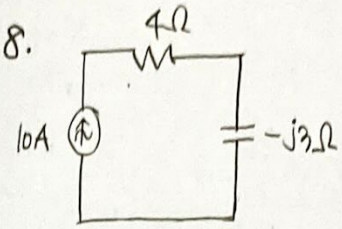
$\therefore X = 6$

7. 22[kVA], 역률 0.8, 무효전력?

$Q = \sqrt{P_a^2 - P_{avg}^2} = \sqrt{22^2 - 22^2\times 0.8^2}$

$= 13.2[kVAR]$

8.

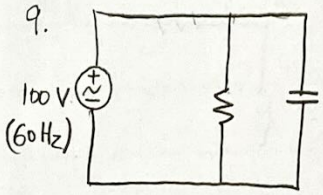


$V_{eff} = I_{eff}\times 4 = 10\times 4 = 40$

$\therefore P_a$(피상전력) $= V_{eff} I_{eff}$

$= 40\times 10 = 400[VA]$

9.



유효전력 $= P_{avg} = V_{eff} I_{eff}\cos\theta = 800[W]$

무효전력 $= Q = V_{eff} I_{eff}\sin\theta = 600[Var]$

$Q = \frac{V_{eff}^2}{X_c} = \frac{100^2}{\frac{1}{\omega C}}$

$= 100^2\times 2\pi\times 60\times C = 600$

$\therefore C = \frac{6}{600}\times\frac{1}{\frac{100^2}{100}\times\frac{1}{20}\pi}$

$= 1.59\times 10^{-4} F$