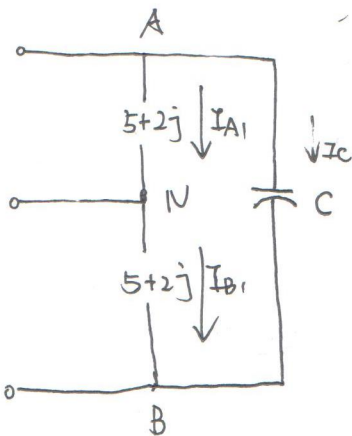


9.5

-9.23-



c7.

$$I_{A1} = I_{B1} = \frac{220}{5+2j} = \frac{110}{29} - \frac{440}{29}j \text{ A}$$

$$I_C = \frac{440}{-X_C j} = \frac{440}{X_C} j$$

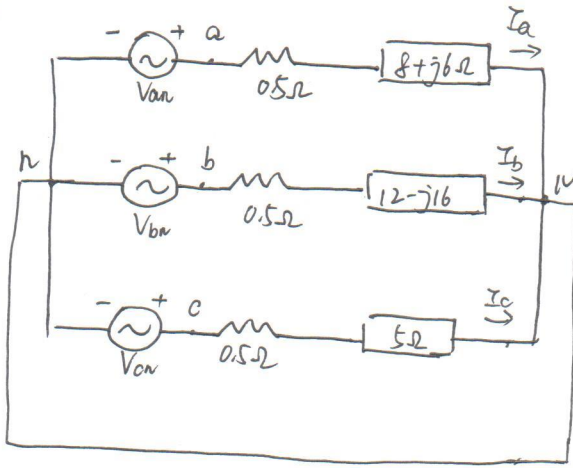
Because it is a unity-power-factor load

$$\frac{440}{X_C} = \frac{440}{29} \quad X_C = \frac{1}{\omega C} = \frac{1}{2\pi f C} = 29$$

$$C = \frac{1}{29 \times 2\pi \times 60} = 91.5 \mu\text{F}$$

$$\text{Q27 } Q = U_{AB} I_C = 440 \times \frac{440}{29} = 6.676 \text{ kVA.}$$

9.8



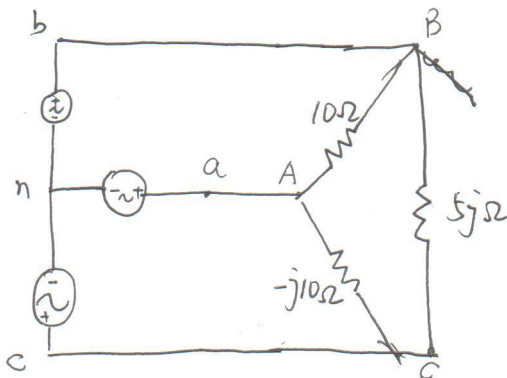
$$\dot{I}_a = \frac{120 \angle 0^\circ}{8.5 + j6} = \frac{4080}{433} - j \frac{2880}{433} \text{ A}$$

$$\dot{I}_b = \frac{120 \angle -120^\circ}{12.5 - j16} = 2.214 - j5.48 \text{ A}$$

$$\dot{I}_c = \frac{120 \angle 120^\circ}{5.5} = -\frac{120}{11} + j18.8 \text{ A}$$

$$\begin{aligned} \dot{I}_{NN} &= -(\dot{I}_a + \dot{I}_b + \dot{I}_c) \\ &= -0.728 - 6.764j = 6.8 \angle 83.86^\circ \text{ A} \end{aligned}$$

9.13



$$\dot{I}_{AB} = \frac{120 \angle 0^\circ - 120 \angle -120^\circ}{10} = 12\sqrt{3} \angle 30^\circ \text{ A}$$

$$\dot{I}_{AC} = \frac{120 \angle 0^\circ - 120 \angle -240^\circ}{-10j} = 12\sqrt{3} \angle 60^\circ \text{ A}$$

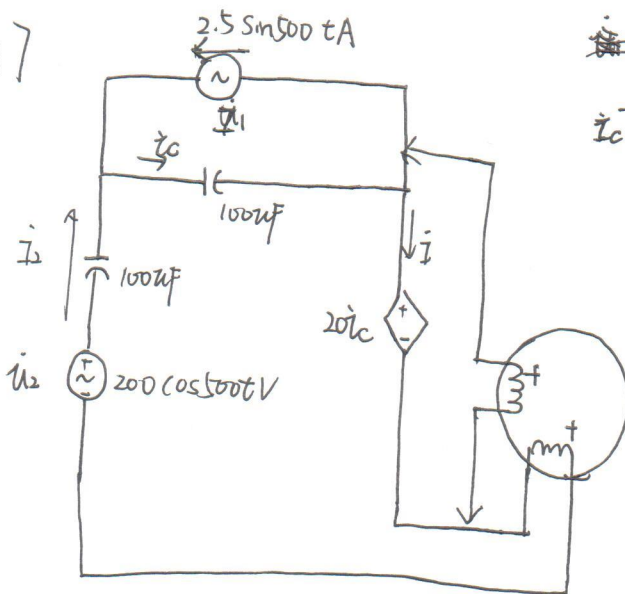
$$\dot{I}_{BC} = \frac{120 \angle -120^\circ - 120 \angle 120^\circ}{5j} = 24\sqrt{3} \text{ A}$$

$$\dot{I}_{BA} = \dot{I}_{AB} + \dot{I}_{AC} = 40.15 \angle 45^\circ \text{ A rms}$$

$$\dot{I}_{bB} = -\dot{I}_{AB} + \dot{I}_{BC} = 60.47 \angle -170.1^\circ \text{ A rms}$$

$$\begin{aligned} \dot{I}_{cC} &= (-\dot{I}_{AC}) + \dot{I}_{BC} \\ &= 36.00 \angle -30^\circ \text{ A rms} \end{aligned}$$

9.17



$$\dot{U}_2 = 200 \angle 0^\circ \text{ V}$$

$$\dot{I}_c = \frac{2.5 \angle 90^\circ}{j \cdot 500 \cdot 100 \cdot 10^{-6}} = -5 \text{ A}$$

$$\dot{U}_2 = 200 \angle 0^\circ \text{ V}$$

$$\dot{I}_1 = 2.5 \angle -90^\circ \text{ A}$$

$$\dot{I}_1 + \dot{I}_2 = \dot{I}_c \quad \dot{I}_2 = \dot{I}_c + 2.5j$$

$$200 \angle 0^\circ = \frac{\dot{I}_2}{j \cdot 500 \cdot 100 \cdot 10^{-6}} + \frac{\dot{I}_c}{j \cdot 500 \cdot 100 \cdot 10^{-6}} + 20 \dot{I}_c$$

$$200 \angle 0^\circ = -j20(\dot{I}_2 + \dot{I}_c) + 20 \dot{I}_c$$

$$\dot{U} = 20 \dot{I}_c = 30 + 60j \text{ V} \quad 10 = -2 \dot{I}_c j + 2.5 + \dot{I}_c \quad \dot{I}_c = \frac{3}{2} + 5j \text{ A}$$

$$\begin{aligned} \dot{I} &= \frac{3}{2} + 3j + 2.5j \\ &= \frac{3}{2} + 5.5j \end{aligned}$$

$$\begin{aligned} P &= |\dot{U}| |\dot{I}| \cos \varphi \\ &= \text{Re}[\dot{U} (-\dot{I})^*] = -375 \text{ W} \end{aligned}$$