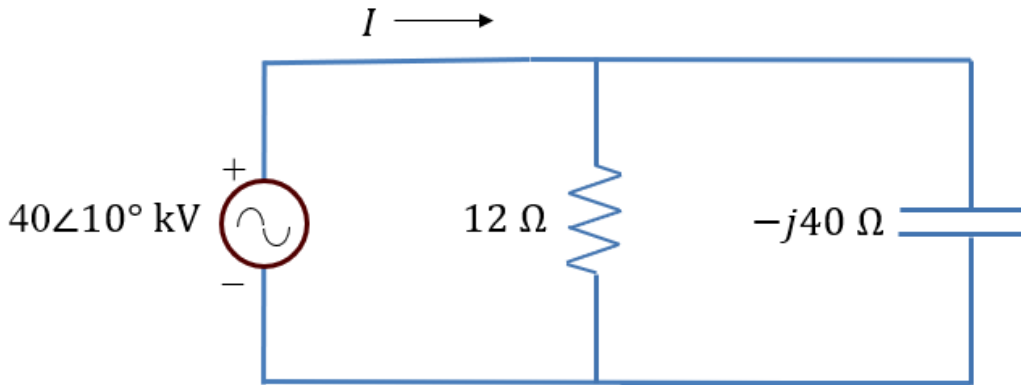


Name: \_\_\_\_\_ UIN: \_\_\_\_\_ Score: \_\_\_\_\_

*(This quiz is just for practice.)*

In the circuit above,

1. Write the source voltage as a time function with cosine, assuming this is a 60 Hz system.

$$v(t) = 40\sqrt{2} \cos(2\pi 60t + 10^\circ) \text{ kV}$$

2. Find the active and reactive power produced by the source. (Remember that  $V = I Z$  and  $S = VI^* = P + jQ$ .)

$$\begin{aligned} Z &= 12 \parallel -j40 = 11 - j3.3 \Omega \\ I &= \frac{V}{Z} = \frac{40\angle 10^\circ \text{ kV}}{11 - j3.3 \Omega} = 3.48\angle 26.7^\circ \text{ kA} \\ S &= VI^* = (40\angle 10^\circ \text{ kV})(3.48\angle -26.7^\circ \text{ kA}) = 133.3 - j40 \text{ MVA} \\ P &= 133.3 \text{ MW} \\ Q &= -40 \text{ Mvar} \end{aligned}$$

3. If the resistor and capacitor are together considered the load, what is the load's power factor?

$$p.f. = \cos(\phi) = \cos(\theta_v - \theta_i) = \cos(10^\circ - 26.7^\circ) = \cos(-16^\circ) = 0.958 \text{ leading}$$