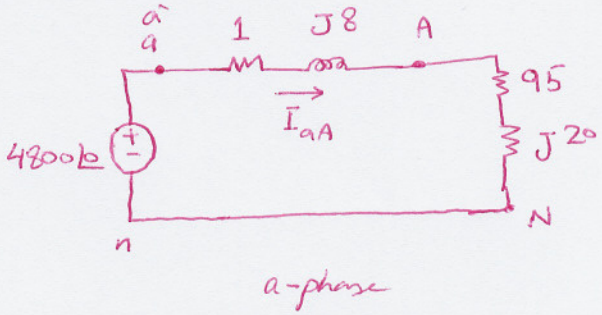
King Fahd University of Petroleum & Minerals
Electrical Engineering Department
EE205: Electric Circuits II (031)

Name: KEY ID# Sec. 02

The magnitude of the phase voltage of an ideal balanced three-phase Y-connected source is 4800 V. The source is connected to a balanced Y-connected load by a distribution line that has an impedance of $1+j8\ \Omega/\Phi$. The load impedance is $95+j20\ \Omega/\Phi$. The phase sequence of the source is positive. Use the a-phase voltage source as the reference.

a) Draw the single-phase equivalent circuit. (*show details*)



a-phase

b) Find the magnitude and phase of the three line currents.

$$I_{aA} = \frac{4800\angle 0}{96+J28} = \frac{4800\angle 0}{100\angle 16.26} = 48.0\angle -16.26^\circ \text{ A}$$

Because of the negative sequence

$I_{bB} = 48.0\angle -136.26^\circ$ A

$I_{cC} = 48.0\angle 103.74^\circ$ A

c) Find the magnitude and phase of the three line voltages at the source.

$V_{an} = 4800\angle 0^\circ$ V $V_{bn} = 4800\angle -120^\circ$ V, $V_{cn} = 4800\angle 120^\circ$ V

$V_{ab} = \sqrt{3}\angle 30^\circ V_{an} = 8313.84\angle 30^\circ$ V

$V_{bc} = 8313.84\angle -90^\circ$ V

$V_{ca} = 8313.84\angle 150^\circ$ V

Good Luck,
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