

Inter American University of Puerto Rico
Bayamón Campus
School of Engineering
Department of Electrical Engineering

ELEN 3301 – Electric Circuits I

Diagnostic Quiz

Name: _____

Enter all your work and your answers directly in the spaces provided on the printed pages. Use the backs of the printed pages as scratch paper, but full credit will only be given to answers that you neatly transfer to the spaces on the printed pages. Answers must be derived or explained, not just simply written down. The quiz is closed book, and calculators or notes are **not** allowed.

Problem	Points	Grade
1	3	
2	12	
3	5	
Total	20	

Problem 1: (*3 points*) Evaluate the matrix multiplication shown below.

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} =$$

Problem 2: (12 points) Recall that $e^{j\theta} = \cos \theta + j \sin \theta$, where $e \approx 2.718$ is Euler's constant, $j = \sqrt{-1}$ and θ is an angle expressed in radians. Evaluate the following expressions:

(A)

$$e^{j\pi} =$$

(B)

$$3e^{j\frac{\pi}{2}} =$$

(C)

$$\sqrt{2}e^{j\frac{\pi}{4}} + \sqrt{2}e^{-j\frac{\pi}{4}} =$$

(D)

$$\frac{1}{j} =$$

(E) A and b are real, positive numbers, and $b \leq 2\pi$.

$$\frac{4e^{j\frac{2}{3}\pi} \cdot 3e^{j\frac{\pi}{2}}}{2e^{j\frac{\pi}{3}} \cdot 5e^{j\frac{\pi}{4}}} = Ae^{jb}$$

$$A =$$

$$b =$$

Problem 3: (5 points) Provide an algebraic expression for $x(t)$:

(A)

$$\frac{dx(t)}{dt} = e^t$$

(B)

$$\frac{dx(t)}{dt} + x(t) = 0$$