Name: _____ (please print)

Signature: _____

ECE 2202 – Quiz 5
April 5, 2022

1. This quiz is closed book, closed notes. You may have one 8.5 x 11" crib sheet.
2. Show all work necessary to complete the problem. A solution without the appropriate work shown will receive no credit. A solution which is not given in a reasonable order will lose credit.
3. Show all units in solutions, intermediate results, and figures. Units in the quiz will be included between square brackets.
4. If the grader has difficulty following your work because it is messy or disorganized, you will lose credit.
5. Do not use red ink. Do not use red pencil.
6. You will have 30 minutes to work on this quiz.

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Room for extra work

In the expression below, find α and β. Assume both are real.

$$\frac{\alpha - j28}{30\angle\beta^o} = (3.6223\angle 47.93^o)^*$$

Room for extra work

In the expression below, find α and β. Assume both are real.

$$\frac{\alpha - j28}{30\angle\beta^\circ} = (3.6223\angle 47.93^\circ)^*$$

$\alpha - j28 = (30\angle\beta^\circ)(3.6223\angle -47.93^\circ)$

$= 108.67\angle\beta - 47.93^\circ$

$\alpha = 108.67\cos(\beta - 47.93^\circ)$

$-28 = 108.67\sin(\beta - 47.93^\circ)$

$\frac{-28}{108.67} = \sin(\beta - 47.98^\circ) \Rightarrow \boxed{\beta = 33^\circ}$

$\alpha = 108.67\cos(33 - 47.98^\circ) \Rightarrow \boxed{\alpha = 105}$

The complex conjugate reverses the sign of the imaginary part of the complex number. So...

$(3.6223\angle 47.93^\circ)^* = 3.6223\angle -47.93^\circ$

If you dropped the * (i.e., if you didn't take the complex conjugate), you got $\beta = -62.86^\circ$.

If you wrote that $(3.6223\angle 47.93^\circ)^* = -3.6223\angle 47.93^\circ$, you got $\beta = +62.86^\circ$.