Name: Date:
Lab Section:

ECE 431 Electric Machinery
Spring 2020

Pre-lab assignment #3

Due at the beginning of your lab session – no late Pre-lab assignments accepted.

2 pt

1. List the tests that you will perform.

Series resistance, Inductance, max. step rate, min. required phases.

4 pt

2. A 4 phase <u>hybrid</u> stepper motor has 6 teeth on the rotor and is driven with full stepping at a step rate of 300 steps/s. What is the step angle for this motor? What is the speed in revolutions per minute at this step rate?

Hybrid motor includes $\Rightarrow$ half steps.

$S = 2mN_r = 2 \times 4 \times 6 = 48$

$\delta_m = \frac{360^\circ}{48} = 7.5^\circ / \text{step}$

$n = 300 \times 7.5^\circ / 360 \times 60 = 375$ rpm.

4 pt

3. Create a chart similar to the one shown in Appendix A of experiment 3 in the lab manual that describes the phase excitation sequence that would be used for <u>dual excitation</u> full stepping of the 4 phase VR stepper motor shown.

CCW ↕ CW	Phase A	Phase B	Phase C	Phase D
	■			■
			■	■
		■	■	
	■	■		

(Or in reverse direction)