

**EXAM 1**  
**ENGN/PHYS 207—Fall 2019**  
**J. Erickson**

## Rules and Regulations

**The exam is due by 5 pm, Tuesday, 08 October 2019.** This is a firm deadline—absolutely no late exams will be accepted! When you are finished please promptly submit all of your written exam work to my office (Howe 221).

This exam consists of  $n \leq 3$  multi-part problems, totaling 100 points. The point value assigned to each problem is noted at the beginning of each sub-problem. **You are allowed up to one contiguous 3 hour block of time to work on this exam.** However, I estimate the actual time for writing this exam will be in the range of  $\leq 1.5$  hours, so you should not have any time pressure. Do NOT open this exam until you are ready to begin writing it. Please note the times at which you opened and closed the exam on the appropriate lines at the next page. Please also *optionally* note the amount of time you spent writing this exam. This information will be used for feedback purposes only and will in no way effect your grade.

On multi-part problems where one part is dependent on the obtaining the answer to another, and you are unable to solve a prerequisite question (e.g. part b asks you “Using your answer from part (a), find the following...” but you were unable to find the solution to part a), the following policy is in effect: At your request, you may barter points in exchange for hints. For example, let’s say part a is worth 10 points, I provide a hint, at the cost of, say, 2 points. The bigger the hint, the more points it costs.

This exam is **closed-book, closed-notes**. You may need to follow hyperlinks to reference external material, namely data sheets. Consultation with any other outside resources or materials is strictly prohibited. You are permitted to use a calculator and/or computer software (e.g., MATLAB) for arithmetic computations only. In the event you use software when solving a problem, please include a printout of your workspace and/or any relevant code. Aid from or consultation with any other electronic source is strictly forbidden.

There is to be absolutely no collaboration on, or discussion about, this exam until after the due date. This also means that you must refrain from conversation with a classmate about this exam, even if both of you have already written and submitted it.

You are to abide by the Honor System at all times. By signing your name on the appropriate line of the next page, you agree that the work represented herein is yours and yours alone, and agree to abide by the rules and regulations of this exam.

Should any question(s) arise during the course of writing the exam, please contact me directly either by phone (x8293) or by email (ericksonj@wlu.edu). I will do my very best to respond to you in a timely manner. Take a deep breath, relax, and **Good Luck!**

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Time Exam Opened: \_\_\_\_\_

Time Exam Closed: \_\_\_\_\_

Time Spent Writing the Exam: \_\_\_\_\_

## Basic Physical Relations

$$i = \frac{dq}{dt} \quad V = \frac{dW}{dq} \quad P = \frac{dW}{dt}$$

$$V_R = IR \quad P = IV$$

$$R_s = \sum_i R_i \quad \frac{1}{R_p} = \sum_i \frac{1}{R_i}$$

$$R_c = \frac{\rho L}{A}$$

## Basic Physical Quantities

$$\text{electron charge } e = 1.602 \times 10^{-19} \text{ C}$$

$$1 \Omega = 1 \text{ V/A}$$

$$1 \text{ S} = 1 \text{ A/V}$$

$$1 \text{ A} = 1 \text{ C/s}$$

$$1 \text{ V} = 1 \text{ J/C}$$