| Exam 3 — Outline (Revised 3/21/20) | |
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| Course Information: Phys 2B | Instructor Name: John R. Walkup |

### Equations Provided

***d*** = ***v***o*t* + (1/2)***a****t*2 ***v*** = ***v***o + ***a****t*  ***F***net = *m****a*** ***F***g = *m***g** *V* = *kQ*1*/r V* = *Ed R = L/A*

*k =* 9 X 109(SI units) *WC = –*PE *WNC =* E *Wnet =* E *W* = *Fd*cos*mv*2

*E*Q = *kQ/r*2 PE = *kQ*1*Q*2*/r V = IR C = k*o*A/d C = Q/V e =* 1.6 X 10-19 *C E = hf*

*B =* *oNI/(2**r)* o*=*4 *X 10-7* (SI units) *F* = *qvB*sin *F = BIL*sin

### This exam will be timed at 75 minutes and completed on WebAssign. The date is on the syllabus. The duration is a hard deadline, so be sure to input your answers before the time limit expires.

### The Free Response questions will be completed by you on a separate sheet of paper and uploaded in the Assignment section of Canvas. The easiest way to do this is to take a snapshot of your work and upload the image. You will have until 10 pm to upload your solutions.

### I have created an unscored test assignment in Canvas titled Exam 3 Test Submission. You can use this to test your ability to submit the free response questions. Make sure your phone is sufficiently charged before taking the exam.

#### Multiple-choice questions

1. This will be one of the conceptual questions from one of your homework assignments. (Review all of the homework problems that did not involve typing a numerical answer.)
2. This will be another one of the conceptual questions from one of your homework assignments.
3. A charge will travel through an electric field. You will indicate that you know what happens to the potential energy, kinetic energy, and total energy of the electron as it does so.
4. Study problems 1, 2, and 3 from the assignment “Basic Charge and Coulomb’s Law.” I will select another problem from WebAssign that is similar in scope and concept.
5. Study problems 2, 3, 5, and 9 from the assignment “More Magnetism / Inductance.” I will select another problem from WebAssign that is similar in scope and concept.
6. Study problems 4, 5, or 6 from the assignment “Induced Current.” I will select another problem from WebAssign that is similar in scope and concept.
7. Study problems 9, 10, or 11 from the assignment “Induced Current.” I will select another problem from WebAssign that is similar in scope and concept.
8. Study problems 4, 5, 7, or 8 from the assignment “Basic Charge and Coulomb’s Law.” I will select another problem from WebAssign that is similar in scope and concept.
9. Study the problems in “Potential and Potential Energy.” I will select another problem from WebAssign that is similar in scope and concept.
10. Study problem 1 from the assignment “Resistance and More Potential.” Understand it… don’t just try to remember it.
11. A problem involving Snell’s Law.
12. Go over the videos on refraction, reflection, and Snell’s Law that I posted on Announcements. I will ask a fundamental question related to their contents
13. Wild card
14. Wild card
15. Wild card

#### Computations

I will choose **two** of the following:

1. Go over electric motors and generators. Know the physics behind them and why they work. Be able to use simple examples from everyday life (e.g., water turbines) to support your argument. Be sure to use real physics terms in your discussion such as magnetic flux, Lenz’ law, torque, current loop, etc. There are resources announced on Canvas… be sure to watch them.
2. A Kirchhoff’s Law problem much like the one on Exam 2. I will choose one of the resistors in the circuit and ask you to tell me the voltage drop across it, the current passing through it, and the power it dissipates.
3. I will place an image in front of a mirror or lens and ask you to draw the rays that form the image. You will then tell me if the image is real or virtual, magnified or reduced, and upright or inverted. You will use a straightedge (e.g, ruler, side of a book) to make the image as neat as possible. And you will show all work.
4. I will place two point charges and ask you to compute the electric field and the potential at some point in space. I will then ask you to compute the voltage difference between two points in space. Finally, you will tell me what happens to the potential energy, kinetic energy, and total mechanical energy as a charge moves from one point to the other. Go over the problem on Exam 2. (Point B should have been located directly halfway between the two point charges.)
5. I will pick any of the multiple-choice questions and ask you to justify your work.
6. I will pick another one of the multiple-choice questions and ask you to justify your work.