Phys2020: Exam 1, Version A, Feb 11, '16. 7:30-9:15 PM

Your Name (please print neatly!) _____

Student ID # _____

TA's name (**Circle one!!**)

Robert Ariniello Nicholas Kellaris Prasanth Prahladan

Thomas Gray Andrew Spott Shane Rightley

Day your lab meets (**Circle one!!**) Tue Wed Thu

Time your lab starts (**Circle one!!**) 8 10 12 2

Please follow these instructions before you start the exam!

☐ Fill in the lines above, and *circle* your TA + the day and time of your lab.

☐ Write in ***and*** *bubble in* your name *and* your ID # on the bubble sheet!

☐ Write ***and*** *bubble* the exam version **(A)** in the space (top left of the bubble sheet.)

Double check all the above! Then, please wait until a TA announces you may begin.

There are (We'll see, probably 20-25) **multiple choice questions**

Please BUBBLE IN your answer on the bubble sheet. Answers circled on this exam will NOT be used for grading purposes!! Use a #2 pencil. Erase mistakes carefully. If you can't thoroughly erase, ask for a fresh bubble sheet.
At the end, *check* that you have bubbled in *one* answer only, for all questions.

All questions are weighted the same (so don't let yourself get "stuck" on one problem, move on, come back if you have time!)

PLEASE turn in your exam in the **proper pile** up front! Ask if it's confusing - thanks!

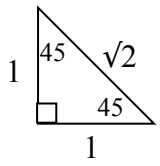
"On my honor, as a University of Colorado at Boulder student, I have neither given nor received unauthorized assistance on this work"

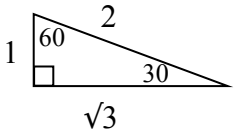
Signature _____

This exam is double sided, please look at the backs of pages!

Useful constants:

k = 9x10^9 N m^2/C^2,
e = 1.6x10^{-19} C,





On this exam, please neglect gravitational forces unless we explicitly say otherwise.

Some Units:
Units of [force] = [N] = [kg*m/s^2],
Units of [energy, or work] = [J] = [N*m] = [kg*m^2/s^2]

Useful Formulas:

Newton's Second Law
$\vec{F}_{net} = m\vec{a}$
Work = $\vec{\mathbf{F}} \cdot \vec{\mathbf{d}}$,

Coulomb's Law
$|F_{elec}| = \frac{k|q_1||q_2|}{r^2}$

Electric Fields
$\vec{E} = \frac{\vec{F}}{q}$
Special cases of the above: $\left|E_{near\ a\ point\ charge}\right| = \frac{k|q|}{r^2}$
For uniform fields (or short distances), $\left|\vec{E}\right| = \left|\frac{\Delta V}{\Delta d}\right|$

Electric Potential (or "Voltage")
$\Delta V = \frac{\Delta PE}{q}$
Special cases of the above: $V_{near\ a\ point\ charge\ q} = \frac{kq}{r}$
$\Delta V_{in\ uniform\ field} = -Ed$ (where d is the distance parallel to the electric field)

Capacitors
$Q = C\Delta V,\ C_{parallel\ plate} = \frac{A}{4\pi k\ d}$, stored energy in capacitor: $U = \frac{1}{2}C(\Delta V)^2 = \frac{1}{2}\frac{Q^2}{C} = \frac{1}{2}Q\Delta V$