Due Date: March 14 Aaron G. Kebede Grade 11 Physics March 10, 2022

## Week of March 7 Homework

Question 1. Write down an explanation for the following concepts related to force.

- 1) What is force? What is the SI unit of force?
- 2) Give the dimensional analysis for the SI unit of force.
- 3) What are the fundamental forces in nature? Give examples for each.
- 4) Draw a free body diagram for an object rolling down an inclined plane.

**Question 2.** Give a response for the following conceptual questions.

- 1) Newton's First Law is called the law of inertia. Intuitively thinking, a heavier object will be harder to move. What is the relationship between inertia and mass?
- 2) A rock is thrown straight up. What is the net external force acting on the rock when it is at the top of its trajectory?
- 3) If a constant, nonzero force is applied to an object, what can you say about the velocity and acceleration of the object?
- 4) Define normal force. What is its relationship to friction when friction behaves simply?
- 5) Does the acceleration of a body in Earth's gravitational field dependent on the mass of the body? Explain logically and show mathematically if it does or not.



FIGURE 1. Capacitors connected in a circuit

**Question 3.** Figure 1 shows a mass being pulled up an inclined plane using a pulley system.  $M_1$ =4KG and  $M_2 = 20$  KG. If the coefficient of kinetic friction between  $M_1$  and the surface of the incline is 0.3, find the acceleration of  $M_1$  up the the incline.(Use gravity as  $9.81\frac{N}{KG}$ )

Question 4. Find the electrostatic and gravitational forces between a proton and an electron. Recall that  $\epsilon_0 = 8.85 \times 10^{-12} \frac{C^2}{Nm^2}$ ,  $G = 6.674 \times 10^{-11} \frac{KG^2}{Nm^2}$ 

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