**Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**PHY2049C, Quiz 5**

**A- Read all the quiz once, or twice, before beginning to write. Make sure to comprehend all questions and start with those you fell most confident.**

**B – Be clear and concise. There are no extra points for being verbose or writing extra.**

**C –Only use the white pages that I will provide. You have 60 minutes to answer the quiz.**

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**Problem 1**

Figure 1 shows a rectangular solid conductor of edge lengths *L*, 2*L*, and 3*L*. A potential difference *V* is to be applied uniformly between pairs of opposite faces of the conductor as in Figure 2 using the same battery for all three cases (The potential difference is applied between the entire face on one side and the entire face on the other side.) First *V* is applied between the left–right faces, then between the top–bottom faces, and then between the front–back faces. Rank those pairs, greatest first, according to the following (within the conductor): (a) the magnitude of the electric field, (b) the current density, (c) the current. Justify each ranking.

A rectangular object with text

AI-generated content may be incorrect.A close-up of a vent

AI-generated content may be incorrect.

Figure 1 Figure 2: Potential difference is applied across an entire face

**Problem 2**

All batteries and lightbulbs are identical. (a) Draw a circuit diagram of these situations. (b) Rank the light **bulbs** in terms of which emits most light in their respective arrangements.

A diagram of a battery and two light bulbs

AI-generated content may be incorrect.A diagram of a battery and two light bulbs

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AI-generated content may be incorrect.

d

e

**Problem 3**

**A diagram of a rectangular object with blue lines and arrows

AI-generated content may be incorrect.**

The Figure shows a 7cm wide metalic film. Initially, the metal has a uniform surface charge density of -3.0 nC/m^2; subsequently, it is connected to ground to remove the excess charge. Afterwards, it is wrapped onto a 4-cm-diameter roller that turns at 55 rpm (revolutions per minute). What is the current of the moving film?

7 cm

4 cm