GroundLab

GroundLab
Paper-Based Exam

Spring 2021-2022
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Name	Surname	Student ID	Signature

Part A: Mandatory Questions: Questions asked in this part are expected to be answered with high success. If you can not answer all of the questions in part A, your exam will be graded as unsatisfactory.

A-1) A Mechanical safety switch located next to the GroundLab door is given in Fig. 1. Briefly explain two of its purposes.

Figure 1: Mechanical Safety Switch

A-2) GroundLab has many drilling tools. While using them, the drill bit is very likely to break as shown in Fig. 2, especially the drilling is not performed perpendicularly to the surface and the bit is cheap. Since the bit is under extreme tension, broken pieces may flow in any direction with high speeds, and one of the directions may be through your eyes. Thus, there are two mandatory safety measures while drilling in terms of protective equipment and behavior. Explain them in the below box.

Protective Equipment:

Figure 2: Broken drill bit.

Behavior:

A-3) Assume you do not know how to use one of the equipments available in the GroundLab. Write two different approaches to learn how to use that equipment. What is expected from you by GroundLab if you still do not feel qualified enough to use that device after going through those two steps.

The first approach I take would be:

The second approach I take would be:

If I still do not feel comfortable with the device and still do not know which occupational injuries it may cause:

A-4) Assume you are a GroundLab member. Are you allowed to carry devices from where it is placed to somewhere you want them to be inside the laboratory?

A-5) Assume you are a GroundLab member. Are you allowed to take devices outside of the laboratory even for short durations?

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A-6) Assume you are a GroundLab member. You may cut and drill things resulting in a mess. Are you allowed to do such?

A-7) Assume you quit the laboratory. Complete the expected procedure you have to follow in the below box.

Electricity: **Tidying up:** **If there are people in the laboratory:** **If I am the last person to quit:**

A-8) Assume you are a GroundLab member. Can you allow your friend(s) who are not GroundLab members to come inside of the laboratory considering they do not use any of the equipment and just sit there?

A-9) Is GroundLab free to use, When are you allowed to use it?

Part B: Practical questions: Part B is graded over 100 points. The maximum point to receive from each question is written next to the relative question, If your grade for part B is less than 50, your exam will be graded as unsatisfactory.

B-1) Match the purpose of the devices with their images given below. (72 points)

Purposes

(1): Blows hot air. The temperature of blown air ranges between 50C to 650C when the device is on.
(2): Generates arbitrary waveforms.
(3): Drills. Immovable
(4): May be used for soldering purposes.
(5): May be used as a voltage source. Offers the current limit.
(6): Drills & screws. Lightweight and cordless.
(7): Generates vibration. May be used for cutting or sanding.
(8): Cuts wood like materials with a back and forth moving saw
(9): Drills & screws. and cordless.

Images

				
				

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B-2) Explain the purpose of the bracelet given in Fig. 3 (14 points)

B-3) In Fig. 4, the image of typical soldering flux is given. Why do we use soldering flux while soldering? (14 points)

Oxidization (rust):

Prevention:

Figure 4: A typical soldering Flux

Part C: Discussion: These questions are not graded and no answer is true or wrong. To pass this part, you have to write your thoughts on the issue. If your answer is not sufficient enough, your exam will be graded as unsatisfactory.

C-1: Assume you are entering the laboratory and it smells like Beyti Kebap due to someone throwing away its package in one of the GroundLab bins. Then you go to an empty desk and see food leftovers. What would you feel? (about 4 sentences is needed)

C-2) Assume there are two ground lab members, X & Y. X use different resistors from the resistors box for his laboratory project. Thinking it is wasteful to throw away resistors, X puts them into the relative resistor boxes after he finishes with them. Yet he mistakenly puts a 1Ohm resistor into the 10k Ohm resistor box and lefts the laboratory. Then Y comes into the labratory. He takes a resistor from a 10K resistor box. Not checking the color codes of the resistor, he mistakenly uses a 10ohm resistor in his circuit and his circuit blows. What do you think about this? Would you put used resistors into the resistor box after you finished with them? Would you trust the labels only or would you check the component value before using it? (about a paragraph is needed)