**2020년도 2학기 4190.777 (001)**

**컴퓨터구조특강 (양자컴퓨팅 하드웨어 및 양자 네트워크 특강)**

**Homework #1**

**Due date: Sep. 28, 2020 11:59pm**

If you submit after the due date, your score will be deducted by 20%.

No more submission will be accepted after Sep. 30, 2020. 11:59pm

won’t be graded.

**To reduce the grading burden, the homework will be graded all-or-nothing style. We will grade just a few problems randomly sampled from the homework and renormalize the total grading according to the relative weight of each problem. Also, within each problem, there may be several sub-problems, but we will grade only a few sub-problems within each problem, and the score of each problem will be determined by the graded sub-problems proportionally.**

**For example, if problem 1 is composed of 5 sub-problems, we will decide which sub-problems will be graded later, and if you solved that sub-problems correctly, you will get the full credit of problem 1. In the worst case, you might have solved all other sub-problems correctly, but got the wrong answers in all the graded sub-problems. That is an unfortunate situation, but the score for that entire problem will become 0. Without this policy, we cannot grade so much homework efficiently.**

**You can answer all the questions either in Korean or English. You can complete your homework either typing with a computer or with your own hand-writing. For typing with a computer, you can even use this HW .docx file, but when you are uploading on ETL, only pdf file is accepted. When writing with hand, it should be clearly legible and the pdf file may either be a scanned-copy or camera-taken picture of your homework, but please double check that the final pdf file is clearly legible (if I cannot read it, it cannot be graded.) Please make sure you denote the number of the problems correctly.**

**Generally, I encourage discussion with other students about how to solve the problems, and frequently it leads to a better understanding of the topic. BUT, when you are writing down your solution, the solution should be completed by yourself, and you should declare whom you had the discussion with. There will be no penalty for declaration of collaboration, but if you don’t declare in advance, and if there is enough evidence for a collaboration, there will be a serious penalty.**

**Prob. 1** (25 points) This is a simple exercise for tensor index notation. Prove the following identities using tensor index notation. and is a vector function and is a scalar function in 3D space.

1. (appears in page 11 of Lecture note 03)
2. (appears in page 4 of Lecture note 04)

**Prob. 2** (20 points) Please derive the four boundary conditions (a)~(d) of electromagnetic fields using the following integral forms of Maxwell’s equation (i)~(iv):

The purpose of this problem is to make sure that you remember how those boundary conditions were derived, which are heavily used in Lecture 05. You can write down in your own term or in extreme case, you can simply copy the content of section 7.3.6 word-to-word.