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EE214000 Electromagnetics, Fall 2020

Your name: _____ ID: _____ Oct. 5th, 2020

EE214000 Electromagnetics, Fall, 2020
Quiz #5-1, Open books, notes (31 points), due 11 pm, Wednesday, Oct. 7th, 2020
(email solutions to 劉峰麒 alex851225@gmail.com)

Late submission won't be accepted!

1. What are the two postulates and their physical meaning for electrostatics? Define all the symbols in your answers (8 points)

2. What happens if you define the electric field intensity as $\vec{E} = +\nabla V$, where V is the electric potential ? Is there a way to rescue the definition "work done externally …." for V? (3 points)

3. Would a lightning rod attract or avoid catastrophic discharge from a high cloud? View the following film to explain it
https://www.youtube.com/watch?v=wGc3q4dVOS0 (5 points)

4. What is the R dependence of the field and potential of an electric dipole in the far zone? (2 points) Explain why the field and potential have a weak dependence on R in comparison with those of a monopole charge? (3 points)

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5. Draw the equipotential lines and electric field lines of an electric dipole on the plane of $\phi = 90°$? The two dipole charges are aligned along the z axis. Show the directions of the electric field lines with reference to the polarity of the charges. (5 points)

6. What is the Gaussian surface of an infinite straight line charge? (2 points) Use it to derive the electric field (magnitude and direction) intensity at *r*. Assume a line charge density of $-\rho_l$ on the line. (3 points)