

大同大學 九十七學年度 碩士班入學考 試題

考試科目:電磁學 所別:通訊工程研究所 第1/1頁

註:本次考試不可以參考自己的書籍及筆記; 不可以使用字典; 可以使用計算器。

1. (25 %) A point charge Q exists at a distance d above a large grounded conducting plane. Determine
 1. The surface charge density ρ_s
 2. The total charge induced on the conducting plane.

2. (25%) Explain the following terms:
 - a. Polarization in materials
 - b. Eddy Current
 - c. Standing wave (on a transmission line)
 - d. Plane wave of radiation
 - e. Antenna Efficiency

3. (25%) Prove that a maximum power is transferred from a voltage source with an internal impedance Z_g to a load impedance Z_L over a lossless transmission line when $Z_i = Z_g^*$, where Z_i is the impedance looking into the loaded line. What is the maximum power-transfer efficiency?

4. (25%) Find the Poynting vector on the surface of a long, straight conducting wire (of radius b and conductivity σ) that carries a direct current I . Verify Poynting's theorem.