

大葉大學 九十二 學年度 研究所碩士班 招生考試試題紙

系 所 別	組 別	考 試 科 目 (中文名稱)	考 試 日 期	節 次	備 註
電信工程	甲	電磁學	4月13日	第三節 13:30~15:00	共乙頁

註：考生可否攜帶計算機或其他資料作答，請在備註欄註明（如未註明，一律不准攜帶）

說明題：

1. Please describe phasor form of Maxwell's equations. (本題 10 分)
2. Define (1) electric dipole moment and magnetic dipole moment, (2) skin depth  $\delta$ .  
(本題 10 分，每小題 5 分)

填充題：須有推算過程，並請將推算結果之答案寫如題目所示之格式

3. A coaxial structure, shown in Fig.1, consists of an inner conductor of radius  $a$  and an outer conductor whose inner radius is  $b$ . The space between the conductors is filled with a medium of permittivity  $\epsilon$  and permeability  $\mu$ , and the length of  $l$ . Please determine the capacitance  $C$  and inductance  $L$  of the coaxial structure. (本題 20 分)

答案 3:  $C = \underline{\hspace{2cm}}$ ,  $L = \underline{\hspace{2cm}}$

4. Determine the electrostatic field intensity  $\vec{E}$  at the point  $(0,1,0)$  if the electric potential (a)  $V = e^{-x} \sin \frac{\pi y}{2}$  [Cartesian coordinates], and (b)  $V = \cos \theta$  [Spherical coordinates]. (本題 20 分，每小題 10 分)

答案 4(a):  $\vec{E} = \underline{\hspace{2cm}}$ , 4(b):  $\vec{E} = \underline{\hspace{2cm}}$

5. The standing-wave ratio on a lossless  $50\Omega$  transmission line terminated in an unknown resistance load  $R_L$  is found to be 2.0. Determine (1) the reflection coefficient  $\Gamma$ , and (2) the resistor  $R_L$ .

[提示:  $SWR S = 2 \rightarrow \Gamma = \rho \angle \theta \rightarrow R_L$ ] (本題 20 分，每小題 10 分)

答案 5(a):  $\Gamma = \underline{\hspace{2cm}}$ , 5(b):  $R_L = \underline{\hspace{2cm}}$

6. Determine (a) the magnetic dipole moment  $\vec{m}$  of an electric circuit formed by the triangular loop of Fig.2, and (b) magnetic torque  $\vec{T}$  due to the magnetic flux density  $\vec{B} = B_y \hat{y} = 1Wb/m^2$ .

(本題 20 分，每小題 10 分)

答案 6(a):  $\vec{m} = \underline{\hspace{2cm}}$ , 6(b):  $\vec{T} = \underline{\hspace{2cm}}$

