大葉大學 九十二 學年度　碩士在職專班　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	第一節 08:30~10:00	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）

1. Please describe the differential and phasor form of Maxwell's equations.　（本題 20 分）

2. State the following electromagnetic laws by their formula (or equation):
    (e.g.) Gauss's law of electric field: $\oint_S \vec{D} \bullet d\vec{s} = Q$　　　　（本題 20 分，每小題 4 分）

    (1) Coulomb's law [提示: $\vec{F}_{12} = $ _____]
    (2) Ohm's law [提示: $\vec{J} = $ _____]
    (3) Equation of continuity [提示: $\nabla \bullet \vec{J} = $ _____]
    (4) Lorentz's force equation [提示: $\vec{F} = $ _____]
    (5) Ampere's circuit law [提示: $\oint_C \vec{H} \bullet d\vec{l} = $ ___]

3. What are the five most common types of EM guiding structures that support TEM waves [寫出五種 two-conductor transmission line]　（本題 15 分）

4. The standing-wave ratio on a lossless 50Ω transmission line terminated in an unknown resistance load R_L is found to be 2.0. Determine (1) the reflection coefficient Γ, and (2) the resistor R_L.
   [提示: SWR S =2 ➜ Γ=ρ∠θ ➜ R_L]　　（本題 10 分，每小題 5 分）

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

6. Two dielectric media with permittivities $\varepsilon_1 = \varepsilon_0$ and $\varepsilon_2 = 2\varepsilon_0$ are separated by a charge-free boundary as shown in Fig.1. If we know that $\vec{E}_2 = 1\hat{x} + 2\hat{y} + 2\hat{z}$ in region2. Determine $\vec{E}_1, \vec{D}_1, \vec{J}_1$ in the region 1。
   （本題 15 分）

Fig.1
Region 1　　ε₁
Region 2　　ε₂
z