

國立臺北科技大學九十八學年度碩士班招生考試

系所組別：2230 電腦與通訊研究所丙組

第一節 電磁學 試題

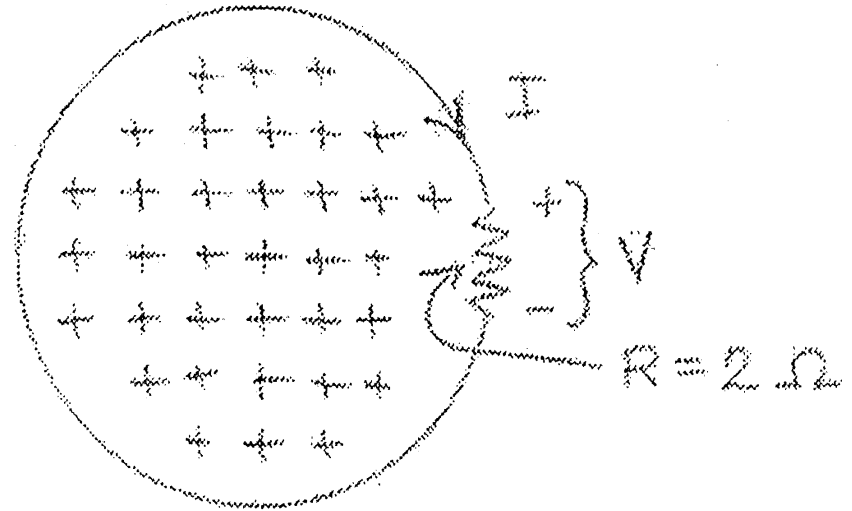
第一頁 共二頁

注意事項：

1. 本試題共四題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

1. What are the maximum and minimum resistances that will be seen along a 50 ohm transmission line having a length of at least one half wavelength and a load VSWR of 3? (25%)

2. The circular path shown encloses a uniform magnetic field into the page. The radius of the path is $r=0.2$ meters and the magnetic flux density is given by $\bar{B} = 20(1 - e^{-t})$ Teslas $\hat{e}_z H_z$, where t is in seconds. (a) Calculate V and I at $t=1$ second.(10%) (b) Graph \bar{B} and V for $0 < t < 4$ seconds.(15%)



注意：背面尚有試題

3. A sinusoidally varying E_θ and H_ϕ set of fields (using spherical coordinates) is radiated uniformly in all directions (isotropically). Show what the expressions for E_θ and H_ϕ must be as functions of time, t , and distance, r , from the transmitter. Assume that the transmitter is an ideal point source of radiation, and that the ratio of E_θ and H_ϕ fields is the same as that for plane wave propagation. (25%)
4. Using Poynting's theorem to derive an expression for the average power flow in an air-filled rectangular waveguide with cross-sectional dimensions a and b ($a > b$) operating in the TE_{10} mode. (25%)