

國立彰化師範大學九十六學年度碩士班招生考試試題

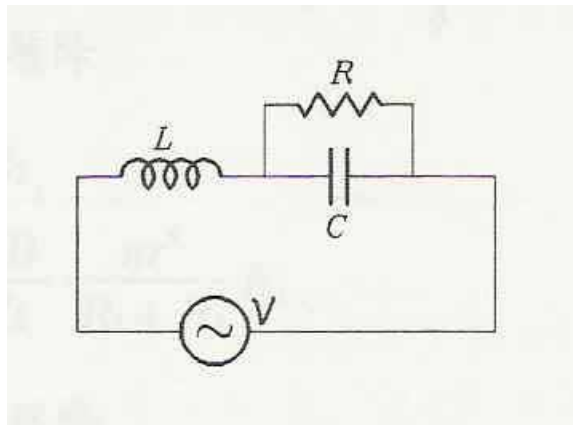
系所：顯示技術研究所

科目：電磁學

☆☆請在答案紙上作答☆☆

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1. Calculate the amount of electrostatic energy of a uniform sphere of charge with radius b and volume density ρ stored in the following regions: (a) inside the sphere, (b) outside the sphere. (15%)
2. In the following circuit, the applied voltage is at a frequency of $\omega = 1/\sqrt{LC}$. Please find the amplitude and phase of the current through the resistor in terms of the voltage and the circuit parameters. (20%)



3. (a) Write down the differential form of the four Maxwell's equations. (b) Derive the integral form of the four Maxwell's equations. (c) Derive wave equation for electric field from Maxwell's equations. (20%)
4. A transparent dielectric coating is applied to glass ($\epsilon_r=4$, $\mu_r=1$) to eliminate the reflection of red light ($\lambda=0.75\mu\text{m}$). (a) Determine the required dielectric constant and thickness of the coating. (b) What percentage of the incident power will be reflected if a light with $\lambda=0.375\mu\text{m}$ is shone normally on the coated glass. (25%)
5. Prove that an elliptically polarized plane wave can be resolved into right-hand and left-hand circularly polarized wave. (20%)