(1) Write down the Maxwell's equations in differential form and integral form. Describe the physical meaning for each variable clearly.(20%)

(2) Describe the principle of the electromagnetic probe for measuring the blood flow.(15%)

(3) Describe the heating effect for the microwave oven based upon the principle of the electromagnetism.(15%)

(4) Determine the force per unit length between two infinitely long parallel conducting wires carrying currents I_1 and I_2 in the opposite direction. The wires are separated by a distance d.(15%)

(5) A rectangular conducting sheet of conductivity s, width a, and height b. The potential difference V_0 is applied to the side edges, as shown in Figure 1. Find the potential distribution and the current density function within the sheet.(20%)

(6) From the equation of continuity, Derive the Lorentz condition for potentials. What is the simple form for the static field? Explain it.(15%)

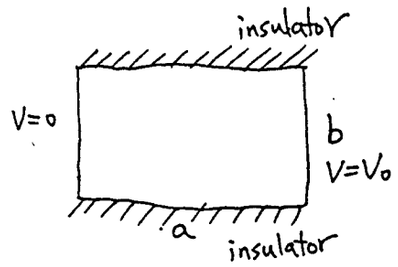

Figure 1.