Problem 1.
Classical electromagnetism (with no sources) follows from the action

$$S = \int (-\frac{1}{4} F_{uv} F^{uv})\, d^4x, \quad where \quad F_{uv} = \partial_u A_v - \partial_v A_u.$$

(a) Derive Maxwell's equations as the Euler-Lagrange equations of this action, treating the components A_u(x) as the dynamical variables. Write the equations in standard form by identifying E^i = - F^{0i} and