

# LEARN

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# Preface

I believe the best way to learn is to solve problems. Solving a problem one time does not mean you understand it, so I would like to keep a catalog some of problems I solved for future reference.

**Part I**

**COURSES**

**No courses yet**

**Part II**

**PAPERS**

**No papers yet**

**Part III**

**TEXTBOOKS**



# Maxwell's Equations - Dan Fleisch

Sources: [Official Website](#)

## Gauss's law for electric fields

1. Find the electric flux through the surface of a sphere containing 15 protons and 10 electrons. Does the size of the sphere matter?

Answer

2. A cube of side  $L$  contains a flat plate with variable surface charge density of  $\sigma = -3xy$ . If the plate extends from  $x = 0$  to  $x = L$  and from  $y = 0$  to  $y = L$ , what is the total electric flux through the walls of the cube?

Answer

3. Find the total electric flux through a closed cylinder containing a line charge along its axis with linear charge density  $\lambda = \lambda_0(1 - x/h)$  C/m if the cylinder and the line charge extend from  $x = 0$  to  $x = h$ .

Answer

4. What is the flux through any closed surface surrounding a charged sphere of radius  $a_0$  with volume charge density of  $\rho = \rho_0(r/a_0)$ , where  $r$  is the distance from the center of the sphere?

Answer

5. A circular disk with surface charge density  $2 \times 10^{-10}$  C/m<sup>2</sup> is surrounded by a sphere with radius of one meter. If the flux through the sphere is  $5.2 \times 10^{-2}$  V · m, what is the diameter of the disk?

Answer