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Workbook

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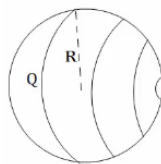For any questions please contact us at +44-161-850-4375 or info@proprep.com

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Gauss's Law

Gauss's Law

Questions

1) Find the electric field due to an infinite wire of charge density λ.

**2)** Find the electric field of a uniformly charged spherical shell of radius R and total charge Q.

3) Find the electric field of an infinite cylinder.
   a. Assume that it has uniform charge density σ (cylindrical shell).
   b. Assume that it has uniform charge density ρ (solid cylinder).

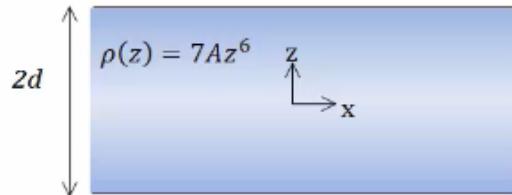**4)** Calculate the electric field due to an infinite plane of uniform charge density σ.

5) Find the electric field of a non-uniformly charged sphere of radius R and charge density $\rho(r) = \rho_0 \frac{r}{R}$.
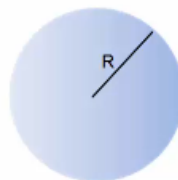
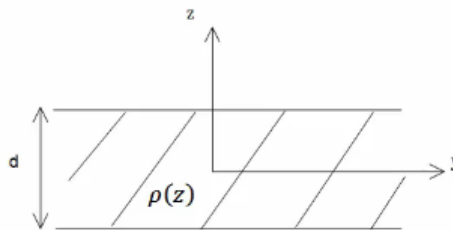**6)** An infinite plane, of width d, has charge density $\rho(z) = Az$ which is dependent on the distance away from the centre of the plane.
   A is a constant. What is the electric field?

7) An infinite plane, of width $2d$, is charged with charge density $\rho(z) = 7Az^6$, where A is a constant. The z axis is perpendicular to the plane and at its centre.

a. What is the electric field?

b. Show that Gauss' law in differential form is applied here.

c. Find the curl, $\vec{\nabla} \times \vec{E}$ of the electric field and explain the result.

8) An infinite plane, of width d, has charge density $\rho(z) = Az$ which is dependent on the distance away from the centre of the plane. A is a constant. What is the electric field?

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