

PHYSICS 507
1st HOMEWORK
Dr. V. Lempesis

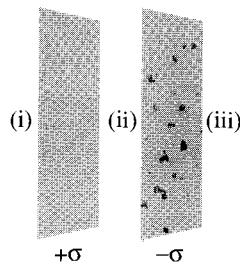
Hand in: Sunday 1st of March 2015

Student Name : _____

Student ID: _____

Each question gets 20 marks for full answer

1. Find the gradient of the magnitude of a vector $r = \sqrt{x^2 + y^2 + z^2}$.
2. Find the angle between the two body diagonals of a cube.
3. Two infinite parallel planes carry equal but opposite uniform charge densities $\pm\sigma$. Find the field in each of three regions: (i) to the left of both, (ii) between them, (iii) to the right of both



4. Find the electric field (magnitude and direction) a distance z above the midpoint between two equal charges q . Check your result is consistent with what you would expect when $z \gg d$.
5. A small non-conducting bal of mass $m = 1.0mg$ and charge $q = 2.0 \times 10^{-8} C$ hangs from an insulating thread that makes an angle $\theta = 30^\circ$ with the vertical. Find the surface charge density of the sheet which is assumed as infinitely long.

