

# HW #1

Physics 406

(due 01/30/12)

## Reading-

Omar (0) Chapter 1

Handouts 1 & 2 on quasicrystals

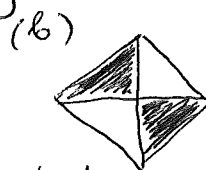
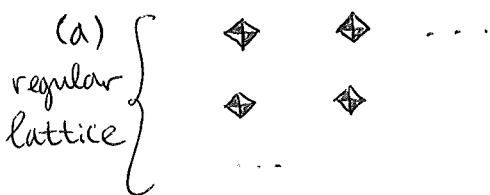
① 0 Ch. 1, problem 1.

② 0 Ch. 1, problem 3.

③ Show that the volume of the primitive Bravais cell is  $\frac{a^3}{2}$  for the bcc lattice &  $\frac{a^3}{4}$  for the fcc lattice ( $a$  is the side of the cube).

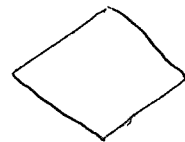
④ A plane in a lattice with primitive vectors  $\vec{a}_1, \vec{a}_2, \vec{a}_3$  has intercepts at  $3\vec{a}_1, 2\vec{a}_2, -2\vec{a}_3$ . Calculate the Miller indices of the plane. What is the direction perpendicular to this plane?

⑤ For one "crystal" and two polygons below, identify the point groups symmetry operations (assuming that the "crystal" is infinite). Which operations are shared by all three?



all tetrahedrons have equal sides.

(c)



have equal sides.