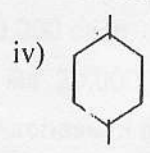
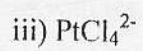
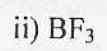
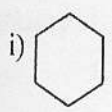




EASTERN UNIVERSITY SRI LANKA
DEPARTMENT OF CHEMISTRY
SECOND EXAMINATION IN SCIENCE (2002/2003)
SECOND SEMESTER-2004
CH-206 X-RAY CRYSTALLOGRAPHY, SYMMETRY & SYMMETRY
ELEMENTS AND PHASE RULE (Proper)

01.

a) What are the symmetry elements present in the following molecules?



b)

i) What are the Miller indices for the planes having the following intercepts in a simple cubic cell?

I) $a/2, b/2, \alpha c$

II) $a, \alpha b, \alpha c$

III) a, b, c

ii) Draw a schematic diagram for each of the above planes.

c) Potassium crystallizes with body centered cubic lattice and has the density 0.856g/cm^3 .
($N = 6.02 \times 10^{23} \text{ mol}^{-1}$, $K = 39$)

i) Draw a schematic diagram for body centered cubic (BCC) unit cell

ii) How many Potassium atoms are found in a BCC unit cell?

iii) Calculate the length of a BCC unit cell.

02.

a) State the Gibb's phase rule and explain all the terms in it.

b) Define the following terms.

i).Phase ii) Component

c) What are the number of components, phases and degrees of freedom in each of the following equilibria.

i) Thermal decomposition of Calcium Carbonate

ii) Ice-water -vapor system.

d) Draw the phase diagrams of binary liquid mixtures which cannot be separated in to pure component using fractional distillation.

e) Explain the term **azeotrope** and give an example for azeotrope.
