

Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
100-Level 1st Semester Examination – June/July 2016
SCT 131-2 General Chemistry



**Uva Wellassa
University**

Part B

Student Index Number:

1. Provide the answer to the following questions in the given space.

The following questions pertain to the F_2^+ molecule:

a. Write the electron configuration of F and F^+ separately

i. F -

ii. F^+ -.....

(02 Marks)

b. Draw the molecular orbital energy diagram for F_2^+ molecule. Label all of the orbitals specifically.

(2.5 Marks)

c. Write the molecular electron configuration for the F_2^+ molecule

.....
.....
.....
.....
.....
.....

(01 Marks)

d. Determine the bond order for the F_2^+ molecule

.....
.....
.....
.....
.....
.....

(01 Marks)

e. Indicate whether the F_2^+ is paramagnetic or diamagnetic. Provide the reason for your selection

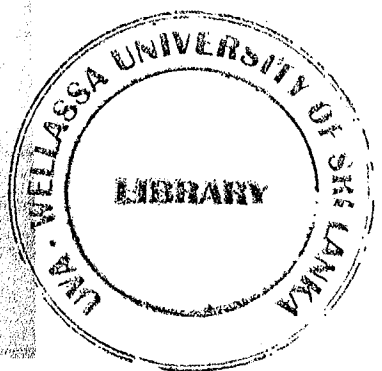
.....
.....
.....
.....
.....
.....
.....

(02 Marks)

f. Compare the relative stability of this molecule to F_2 and F_2^- based on bond order of each species

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

(1.5 Marks)



2. Use a separate booklet to answer the following question.

The K_{sp} for CaF_2 is 3.9×10^{-11} at 25°C . Assuming that CaF_2 dissociate into Ca^{2+} and F^- upon dissolving in water and that there are no other important equilibria affecting CaF_2 solubility

- a. Calculate the solubility of CaF_2 in grams per liter.
(Formula weight of CaF_2 is 78.1 g mol^{-1}) (03 Marks)
- b. Calculate the molar solubility of CaF_2 at 25°C in a solution that contains
i. $0.010 \text{ M Ca(NO}_3)_2$ (02 Marks)
ii. 0.010 M NaF (02 Marks)
- c. Provide the reason for different solubility values of CaF_2 in pure water, in $0.010 \text{ M Ca(NO}_3)_2$ and in 0.010 M NaF . (03 Marks)

