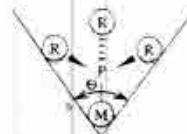


考生注意：1. 依次序作答，只要標明題號，不必抄題。
2. 答案必須寫在答案卷上，否則不予計分，並限以藍黑色筆作答。
3. 試題隨卷繳回。(餘詳詳閱試場規則)

(本題限用英文作答，每格各 1 分，共 20 分)

I. 填空题

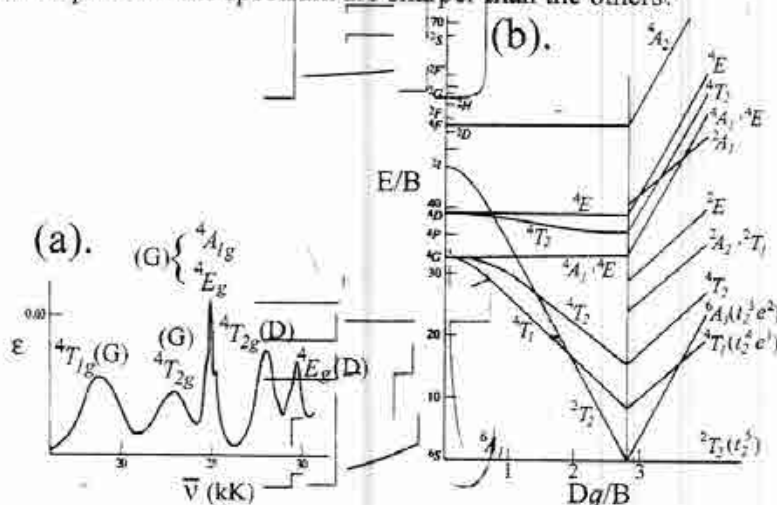
- Henry Taube called complexes having substitution half-life $t_{1/2} < 30$ seconds _____ and called those with longer $t_{1/2}$ _____.
- Oxidative addition reactions 的相反是 _____ reactions.
- HOMO stands for _____.
- LFSE stands for _____.
- VSEPR stands for _____.
- θ in the figure on the right is known as the _____ angle.
- By _____'s definition that F (氟) has electronegativity 4.0.
- Franck-_____ principle states that electron transfer is much faster than nuclear motion.



- What is the point group of each compound below: (每小題各 2 分，共 10 分)
(a) CCl_4 (b) CHCl_3 (c) CH_2Cl_2 (d) NH_3 (e) BH_3

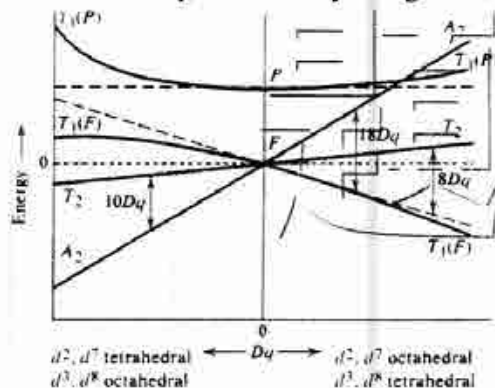
- What are the number of microstates and the ground state of the f^3 electronic configuration. (5 分)

- Absorption spectrum of $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$ and its T.S. diagram are shown below. Why some of the peaks in the spectrum are sharper than the others? (10 分)



(a) Absorption spectrum of $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$
(b) Tanabe-Sugano diagram for d^5 .

- For $[\text{V}(\text{H}_2\text{O})_6]^{2+}$, 3 absorption bands are observed at 12300, 18500 and 27900 cm^{-1} . Assign each band and calculate Dq , B' and C by using the Orgel diagram shown below. (10 分)



Orgel term splitting diagram for d^2 , d^3 , d^7 , and d^8 cases in octahedral and tetrahedral fields.

國立暨南國際大學九十三年學年度碩士班研究生入學考試試題

第 1 節無機化學 適用：(應化所 443)

(本試題共 2 頁，第 2 頁)

考生注意：1. 依次序作答，只要標明題號，不必抄題。

2. 答案必須寫在答案卷上，否則不予計分，並限以藍黑色筆作答。

3. 試題隨卷繳回。(餘詳詳閱試場規則)

6. The following data have been reported for aquation at 298.1K of complexes $trans-[Co(N_4)LCl]^{n+}$ where N_4 is a tetradentate chelate. Tet-b is a more sterically crowded ligand than cyclam.

L	$k \times 10^4 (s^{-1})$	
	$(N_4) = cyclam$	$(N_4) = tet-b$
Cl^-	0.011	9.3
NCS^-	0.000011	0.0070
NO_2^-	0.43	410
N_3^-	0.036	210
CN^-	0.0048	3.4
NH_3	0.00073	

(10 分)

What do these data suggest about the intimate mechanism for aquation?

7. Fill out the missing representation.

(每格各 1 分，共 5 分)

C_{2v}	E	C_2	$\sigma_v(xz)$	$\sigma_v(yz)$		
A_1	1	1	1	1	z	x^2, y^2, z^2
A_2	1	1	-1	-1	R_z	xy
B_1	1	-1	1	-1	x, R_y	xz
B_2	1	-1	-1	1	y, R_x	yz

8. Name the following compounds according to the IUPAC rules: (每小題各 2 分，共 20 分)

- $[Cr(NH_3)_6]Cl_3$
- $[CrCl_2(NH_3)_4]Cl$
- $K_2[Co(N_3)_4]$
- $Li[AlH_4]$ (非 lithium aluminum hydride)
- $[Pd(PPh_3)_4]$ (Ph: 苯)
- $W(CO)_6$
- $HRh(CO)_4$
- $[Fe(CN)_6]^{4-}$
- $[Mn(CO)_5]^-$
- $\eta^5CpMn(\eta^6-C_6H_6)$

9. What are compounds X and Y?

(clearly show the stereochemistry if necessary) X, Y 各 5 分，共 10 分

