2013년도 무기반응론 기말고사 (2013년 12월 12일)
2013 Inorganic Reaction Mechanism Final Exam (Dec. 12, 2013)

학번_____ 이름_____
Student ID # _____ Name_____

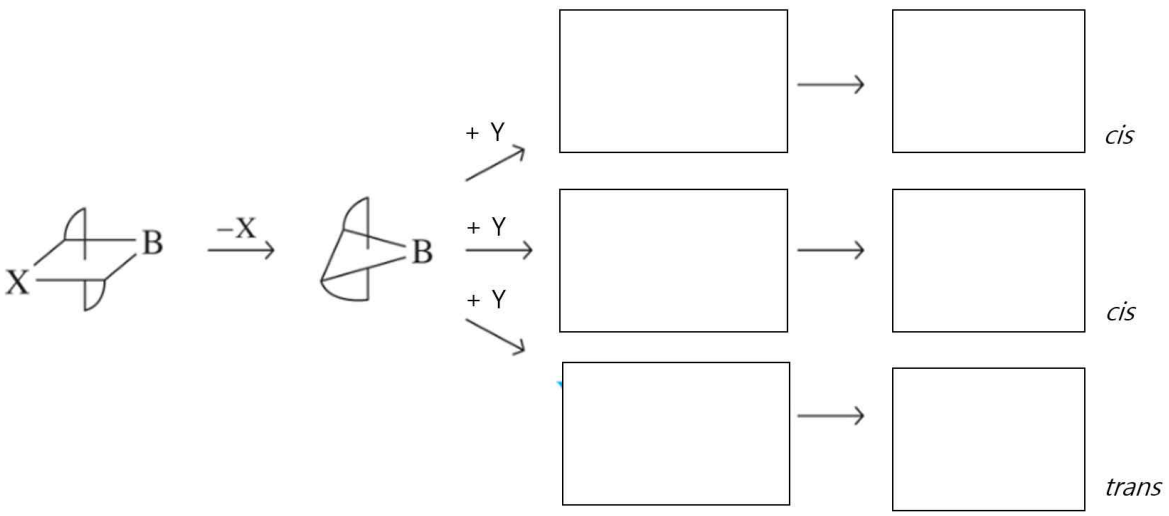
1. 팔면체 배위화합물의 리간드 치환반응 중 associative mechanism은 다음과 같다. steady-state approximation을 이용하여 associative mechanism의 반응 속도를 유도하여라.
1. Following is the associative mechanism of the ligand substitution reaction of octahedral complexes. Derive the rate law of the associative mechanism by using the steady-state approximation method.

$$ML_5X + Y \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} ML_5XY$$

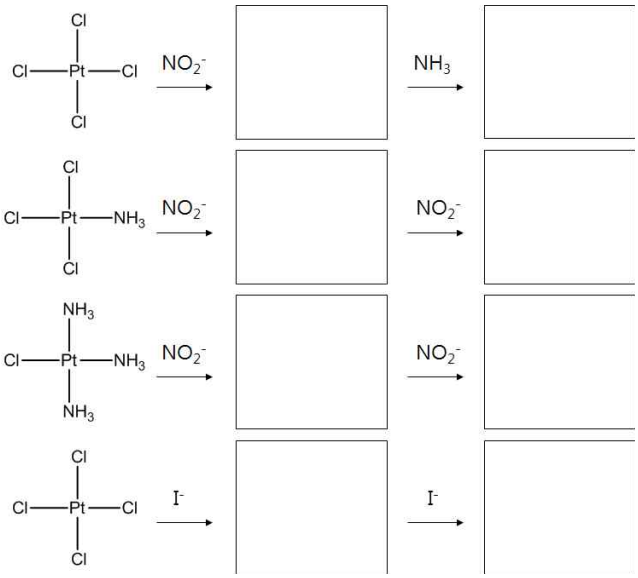
$$ML_5XY \xrightarrow{k_2} ML_5Y + X$$

$$\frac{d[ML_5Y]}{dt} =$$

2. 팔면체 킬레이트 배위화합물의 리간드 치환반응 중 dissociative 치환반응이 다음과 같은 과정을 거친다면 최종 생성물에서 entering ligand Y는 B에 대하여 trans 또는 cis 위치에 있을 수 있다. 다음의 빈칸에 알맞은 구조를 그려라. cis의 경우 Δ 인지 Λ 인지 표시하여라.
2. Following is one of the many possible first steps of the dissociative ligand substitution reaction of octahedral chelate complexes. The entering ligand Y can be placed on trans or cis position of B in the final product. Draw the appropriate structures in the boxes. In the cases of cis, identify Δ or Λ.



3. 다음 사각평면 Pt(II) 착물의 리간드 치환반응의 생성물(Pt(II) 착물)을 그려라.
3. What are the reaction products of the following square planar Pt(II) complexes. Draw the structure of the produced Pt(II) complexes.

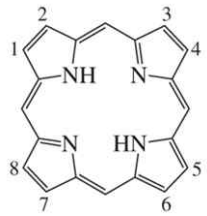


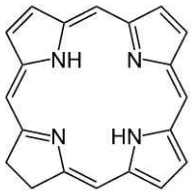
4. 아미노산 중 글리신(glycine)과 타이로신(tyrosine)의 구조를 그려라.
4. Draw the structures of glycine and tyrosine. (amino acids)

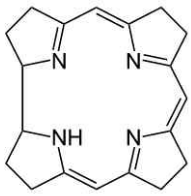
Glycine Tyrosine

5. 다음 화합물의 이름은?

5. What are the names of the following compounds?







6. Deoxyhemoglobin과 oxyhemoglobin에서 Fe의 산화수와 spin quantum number는 각각 얼마인가?

6. What are the oxidation number and spin quantum number of Fe in deoxyhemoglobin과 oxyhemoglobin.

Fe	oxidation number	spin quantum number
deoxyhemoglobin		
oxyhemoglobin		

7. 다음 반응을 촉매하는 enzyme을 보기에서 골라 써라.

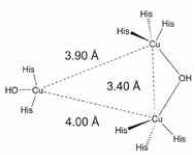
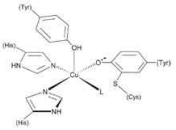
7. What are the enzymes catalyzing the following reactions. Select the enzymes from the list of the enzymes.

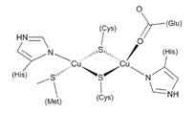
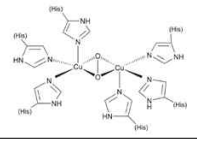
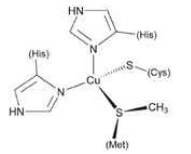
carboxypeptidase, catalase, ceruloplasmin, cytochrome P450 ferritin, nitrite reductase, nitrogenase, NO synthase oxygen evolving complex, peroxidase, photosystem II superoxide dismutase

reactions	enzymes
$2\,H_2O_2 \rightarrow 2\,H_2O + O_2$	
$R\text{-}H + O_2 + 2e^- + 2H^+ \rightarrow R\text{-}OH + H_2O$	
$2H_2O \rightarrow 4e^- + 4H^+ + O_2$	
$2O_2^{\cdot-} + 2H^+ \rightarrow H_2O_2 + O_2$	
$NO_2^- \rightarrow NO \rightarrow N_2O \rightarrow N_2$	

8. Cu함유단백질에서 Cu 자리는 그 배위 구조에 따라 7 가지 형태 (type-1, type-2, type-3, type-4, Cu_A, Cu_B, Cu_Z)로 나뉜다. 다음은 각각 어느 것인가?

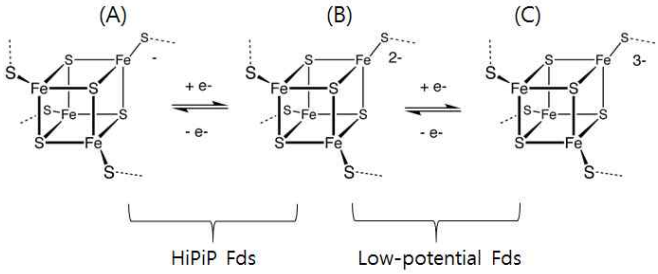
8. Cu centers of Cu-containing enzymes are classified into 7 different types (type-1, type-2, type-3, type-4, Cu_A, Cu_B, Cu_Z) according to the Cu-coordination environments. What are the Cu types of the followings?

structures	Cu types
	
	

9. 다음은 [4Fe4S] cluster의 세 가지 가능한 산화 상태이다. 각각에서 Fe^{2+}, Fe^{3+} 이온의 개수는 각각 얼마인가?

9. In general [4Fe4S] clusters can exist in three different oxidation states. Followings are the three forms. How many Fe^{2+}, Fe^{3+} ions are present in each state?



	(A)	(B)	(C)
number of Fe^{2+} ions			
number of Fe^{3+} ions			

10. 다음은 항암제로 사용되고 있거나 될 가능성이 있는 Pt 착물이다. 각 착물에 대하여 항암백금착물의 structure-activity relationship (SAR)을 만족시키는 것은 Yes, 만족시키지 않는 것은 No로 표시하여라.

10. Followings are the anticancer Pt complexes. Mark each complex as "Yes" for the complex satisfying the structure-activity relationship (SAR), or as "No" for the complex dissatisfying the SAR

	SAR(Yes, NO)		SAR(Yes, NO)