



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

جامعة الملك سعود
كلية العلوم - قسم الكيمياء
1429/11/24 هـ

First Mid Term Exam 1429/1430H (2008/2009G)
Chem 323

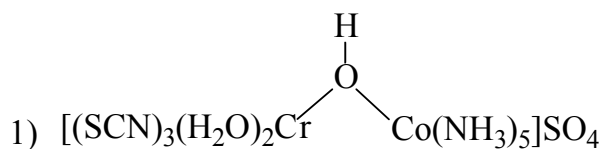
Answer all following questions in the *one hour allowed time*
You may consult the attached Periodic Table

Student Name:

University Number:

Serial Number:

D) According to IUPAC write down the name for each of the following two complexes:



II) According to IUPAC write down Werner formula for each of the following complexes and state the number of ions that could conduct electric current if dissolved in water.

1) Diaquobis(ethylenediamine)cobalt(III) Amminepentanitritocobaltate(III)

Number of ions =

2) Diammine(ethylenediamine)chromium(III) μ -bis(dioxygen)
tetraamminecobalt(III) Bromide

Number of ions =

3) Calcium Dithiosulfatoargentate(I)

Number of ions =

III) For each of the following free ions, calculate the value of Z^* for a valence electron according to Slater rules for electron shielding:

1) Ni^{2+}

$$Z^* =$$

2) Mo^{3+}

$$Z^* =$$

3) Ir^{4+}

$$Z^* =$$

4) Sm^{3+}

$$Z^* =$$

5) Ho^{3+}

$$Z^* =$$



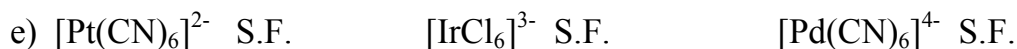
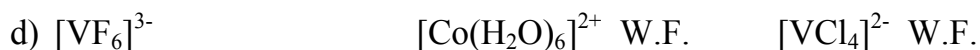
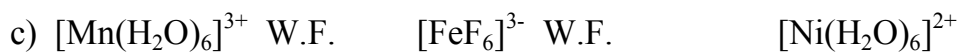
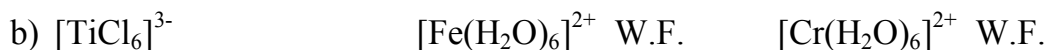
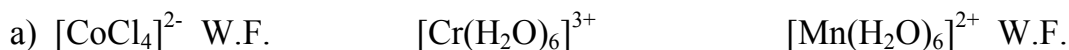
Second Mid Term Exam 1429/1430H (2008/2009G)
Chem 323

Answer all two questions within the *one hour allowed time*
You may consult the attached Periodic Table

Student Name:
University Number:
Serial Number:

Question 1:

Underline the compound which you think that it is the most vulnerable to Jahn-Teller distortion in each of the five following groups:



Question 2:

For each of the following compounds, state the magnetic property (diamagnetic or paramagnetic) and write down the number of the unpaired electrons for each compound:

No.	Compound	Mag. Property	No. of free electrons
1	[Pd(CN) ₄] S.F.		
2	[OsF ₆] ³⁻ S.F.		
3	K[MnO ₄]		
4	[RhF ₇] ³⁻ S.F.		
5	[CoCl ₄] ²⁻ W.F.		
6	[RuBr ₅] ²⁻ C _{4v}		
7	[Fe(CO) ₅] D _{3h} W.F.		
8	[Pt(NH ₃) ₆] ³⁺ S.F.		
9	[MoCl ₆] ²⁻		
10	[Re(NH ₃) ₆] ³⁺ S.F.		



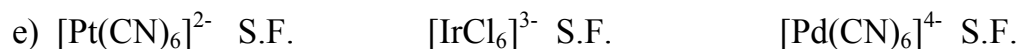
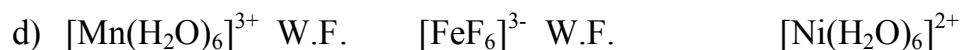
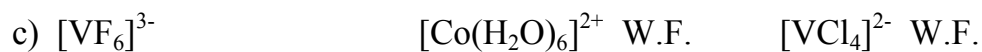
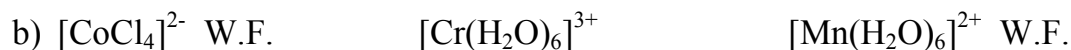
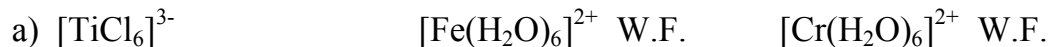
Second Mid Term Exam 1429/1430H (2008/2009G)
Chem 323

Answer all two questions within the *one hour allowed time*
You may consult the attached Periodic Table

Student Name:
University Number:
Serial Number:

Question 1:

Underline the compound which you think that it is the most vulnerable to Jahn-Teller distortion in each of the five following groups:



Question 2:

For each of the following compounds, state the magnetic property (diamagnetic or paramagnetic) and write down the number of the unpaired electrons for each compound:

No.	Compound	Mag. Property	No. of free electrons
1	$[\text{OsF}_6]^{3-}$ S.F.		
2	$[\text{Pd}(\text{CN})_4]$ S.F.		
3	$[\text{RhF}_7]^{3-}$ S.F.		
4	$\text{K}[\text{MnO}_4]$		
5	$[\text{RuBr}_5]^{2-}$ C_{4v}		
6	$[\text{CoCl}_4]^{2-}$ W.F.		
7	$[\text{Pt}(\text{NH}_3)_6]^{3+}$ S.F.		
8	$[\text{Fe}(\text{CO})_5]$ D_{3h} W.F.		
9	$[\text{Re}(\text{NH}_3)_6]^{3+}$ S.F.		
10	$[\text{MoCl}_6]^{2-}$		



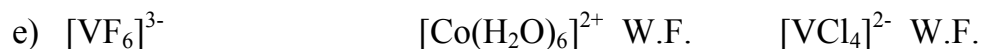
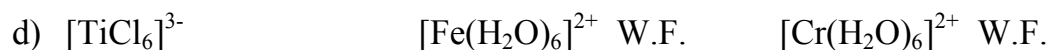
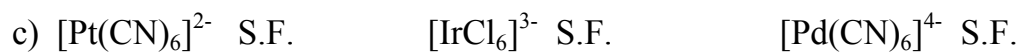
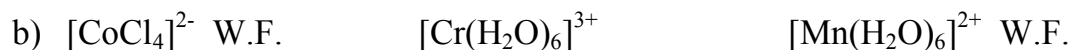
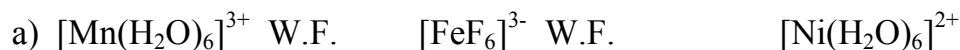
Second Mid Term Exam 1429/1430H (2008/2009G)
Chem 323

Answer all two questions within the *one hour allowed time*
You may consult the attached Periodic Table

Student Name:
University Number:
Serial Number:

Question 1:

Underline the compound which you think that it is the most vulnerable to Jahn-Teller distortion in each of the five following groups:



Question 2:

For each of the following compounds, state the magnetic property (diamagnetic or paramagnetic) and write down the number of the unpaired electrons for each compound:

No.	Compound	Mag. Property	No. of free electrons
1	$\text{K}[\text{MnO}_4]$		
2	$[\text{Pd}(\text{CN})_4]$ S.F.		
3	$[\text{OsF}_6]^{3-}$ S.F.		
4	$[\text{RhF}_7]^{3-}$ S.F.		
5	$[\text{Fe}(\text{CO})_5]$ D_{3h} W.F.		
6	$[\text{CoCl}_4]^{2-}$ W.F.		
7	$[\text{RuBr}_5]^{2-}$ C_{4v}		
8	$[\text{Re}(\text{NH}_3)_6]^{3+}$ S.F.		
9	$[\text{Pt}(\text{NH}_3)_6]^{3+}$ S.F.		
10	$[\text{MoCl}_6]^{2-}$		

King Saud University
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Chemistry Department



Final Exam 1429/1430H (2008/2009G)
Chem 323

Answer all questions on the Four attached sheets within the
three hours allowed time
(You may consult any of the two attached Tables)

Student Name:

University Number:

Serial Number:

Final Exam Mark

Total Mid Term Exams Mark

Sheet I

Question 1:

According to Slater's Rules, calculate Z^* for the following:

a) The 4p electron of As $Z^* =$

b) The 4d electron of Pd $Z^* =$

c) The 4s electron of Cr $Z^* =$

d) The 6s electron of Gd $Z^* =$

e) The 5d electron of Ir $Z^* =$

Question 2:

According to IUPAC, write down the Werner Formula for each of the following complexes:

a) Potassium pentacyanocarbonylferrate(II)

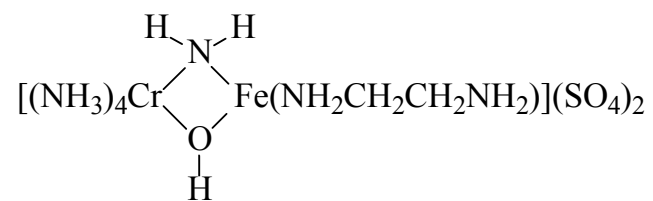
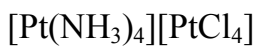
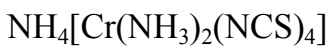
b) Potassium diamminedichlorodioxochromate(V)

c) Pentaquohydroxoiron(III) chloride

Sheet II

Question 3:

According to IUPAC, Name the following five complexes:



Sheet III

Question 4:

For the following ten complexes, state which could be subjected to the ground state Jahn Teller distortion (Yes) and which are not subjected to that effect (No). (**Each wrong marking takes one write marking out**). Calculate also for each complex the magnitude of $\mu_{\text{spin only}}$ in B.M. units:

Complex		J.T. distortion	$\mu_{\text{spin only}}$
$[\text{VBr}_4]^{1-}$	W.F.		
$[\text{CoCl}_4]^{2-}$	W.F.		
$[\text{MnCl}_6]^{4-}$	W.F.		
$[\text{CrCl}_6]^{4-}$	W.F.		
$[\text{TiCl}_6]^{3-}$	W.F.		
$[[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$	W.F.		
$[\text{VCl}_4]^{2-}$	W.F.		
$[\text{Co}(\text{NH}_3)_6]^{3+}$	S.F.		
$[\text{Fe}(\text{CN})_6]^{3-}$	S.F.		
$[\text{MnF}_6]^{3-}$	W.F.		

Sheet IV

Question 4:

For the following seven complexes, write down the electron configuration of the splitted d-orbitals and also calculate the empirical Δ value for each complex (in cm^{-1} unit).



Configuration:

Δ value = cm^{-1}



Configuration:

Δ value = cm^{-1}



Configuration:

Δ value = cm^{-1}



Configuration:

Δ value = cm^{-1}



Configuration:

Δ value = cm^{-1}



Configuration:

Δ value = cm^{-1}



Configuration:

Δ value = cm^{-1}



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

جامعة الملك سعود
كلية العلوم - قسم الكيمياء
1430/4/26 هـ

First Mid Term Exam, Second semester, 1429/1430H (2008/2009G)
Chem 323

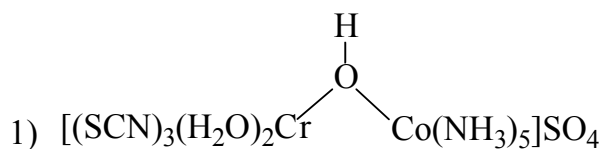
Answer all following questions in the *one hour allowed time*
You may consult the attached Periodic Table

Student Name:

University Number:

Serial Number:

D) According to IUPAC write down the name for each of the following two complexes:



II) According to IUPAC write down Werner formula for each of the following complexes and state the number of ions that could conduct electric current if dissolved in water.

4) Diaquobis(ethylenediamine)cobalt(III) Amminepentanitritocobaltate(III)

Number of ions =

5) Diammine(ethylenediamine)chromium(III) μ -bis(dioxygen)
tetraamminecobalt(III) Bromide

Number of ions =

6) Calcium Dithiosulfatoargentate(I)

Number of ions =

III) For each of the following free ions, calculate the value of Z^* for a valence electron according to Slater rules for electron shielding:

6) Ni^{2+}

$$Z^* =$$

7) Mo^{3+}

$$Z^* =$$

8) Ir^{4+}

$$Z^* =$$

9) Sm^{3+}

$$Z^* =$$

10) Ho^{3+}

$$Z^* =$$



بسم الله الرحمن الرحيم

جامعة الملك سعود
كلية العلوم - قسم الكيمياء
1430/5/28هـ

الاختبار الفصلي الأول (بديل) لأعمال السنة للفصل الدراسي الأول 1430/1429هـ

لمقرر 323 كيم

أجب عن جميع الأسئلة والزمن ساعة واحدة

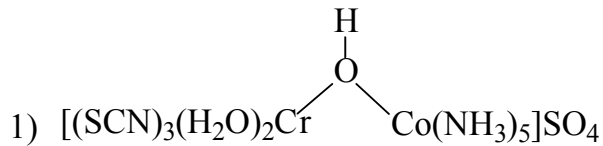
بإمكانك الرجوع إلى الجدول الدوري.

الرقم المسلسل:

اسم الطالب:

الرقم الجامعي:

أولاً: وفقاً لقواعد IUPAC اكتب بالإنجليزية اسم كل معقد مما يلي:



ثانياً: وفقاً لقواعد IUPAC اكتب صيغة فارنر لكل معقد مما يلي مع ذكر عدد الأيونات التي يمكن أن توصل الكهراء عند إذابة كل معقد.

1) Diaquobis(ethylenediamine)cobalt(III) Amminepentanitritocobalt(III)

عدد الأيونات التي يمكن أن توصل الكهراء =

2) Diammine(ethylenediamine)chromium(III) μ -bis(dioxygen)
tetramminecobalt(III) bromide

عدد الأيونات التي يمكن أن توصل الكهراء =

3) Calcium Dithiosulfatoargentate(I)

عدد الأيونات التي يمكن أن توصل الكهراء =

ثانياً: وفقاً لقواعد سلاتر، قيمة Z^* للإلكترون بغلاف التكافؤ لأيونات الحرة من المعقدات التالية:



King Saud University
Science College
Chemistry Department



Second Semester, Second Mid Term Exam 1429/1430H (2008/2009G)

Chem 323

10/6/1430H

**Answer the question on the attached paper within the
*one hour allowed time***

You may consult the attached Periodic Table

Student Name:

University Number:

Serial Number:

Assuming regular symmetry, calculate (in D_q unit) the crystal field stabilization energy (C.F.S.E.), and also state the magnetic character and the number of unpaired electrons for each of the following ten complexes.

No.	Compound	C.F.S.E In D_q	Mag. and No. of free electrons
1	$[\text{Ir}(\text{CN})_4]$ S.F.		
2	$[\text{PtF}_7]^{3-}$ D_{5h} S.F.		
3	$[\text{Os}(\text{CN})_4]^{1-}$ S.F.		
4	$[\text{Fe}(\text{CO})_5]$ D_{3h} W.F.		
5	$[\text{Ru}(\text{acac})_3]$ S.F.		
6	$[\text{CoCl}_4]^{2-}$ W.F.		
7	$[\text{Rh}(\text{CN})_5]^{2-}$ C_{4v} S.F.		
8	$[\text{Re}(\text{EDTA})]$ S.F.		
9	$[\text{Pd}(\text{en})_3]^{4+}$ S.F.		
10	$[\text{Mo}(\text{gly})_2]^{2+}$ S.F.		

King Saud University
Science College
Chemistry Department
27/6/1430H



**Final Exam – Second Semester 1429/1430H (2008/2009G)
Chem 323**

**Answer all questions on the Five attached sheets within the
three hours allowed time
(You may consult any of the two attached Tables)**

Student Name:

University Number:

Serial Number:

Final Exam Mark

Total Mid Term Exams Mark

ملاحظة: عدد الأوراق الكلية ثمانية، وعدد أوراق الأسئلة خمسة،
ويمنع منعاً باتاً نزع أي من أوراق هذا الاختبار.

Sheet I

According to Slater's Rules for electron-shielding, calculate Z^* for the following:

a) The 3d electron of Fe^{2+} ion $Z^* =$

b) The 5s electron of Ag atom $Z^* =$

c) The 4f electron of Eu atom $Z^* =$

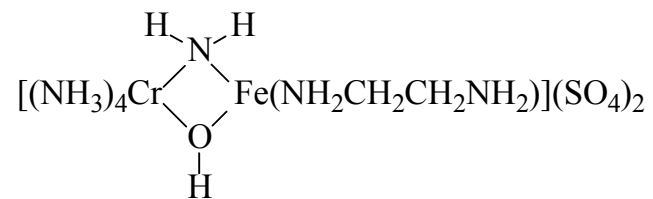
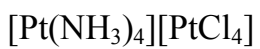
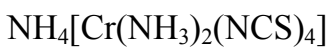
d) The 4d electron of Sn^{4+} ion $Z^* =$

e) The 5d electron of Os^{5+} ion $Z^* =$

(10 marks)

Sheet II

According to IUPAC, Name the following five complexes:



(10 marks)

Sheet III

Write Werner's Formula for each of the following complexes:

Tetraamminecobalt(III)- μ -trihydroxotetraamminecobalt(III) Sulfate

Calcium Dithiosulfatoargentate(I)

Triamminechloro(ethylene)nitroplatinum(IV) Phosphate

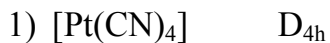
Aluminum Hexacyanoplatinate(IV)

Barium Dibromodioxalatocobaltate(III)

(10 marks)

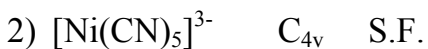
Sheet IV

For the following seven complexes, write down the electron configuration of the splitted d-orbitals and also calculate the empirical Δ value for each complex (in cm^{-1} unit).



Configuration:

$$\Delta \text{ value} = \quad \text{cm}^{-1}$$



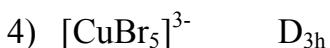
Configuration:

$$\Delta \text{ value} = \quad \text{cm}^{-1}$$



Configuration:

$$\Delta \text{ value} = \quad \text{cm}^{-1}$$



Configuration:

$$\Delta \text{ value} = \quad \text{cm}^{-1}$$



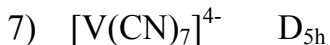
Configuration:

$$\Delta \text{ value} = \quad \text{cm}^{-1}$$



Configuration:

$$\Delta \text{ value} = \quad \text{cm}^{-1}$$



Configuration:

$$\Delta \text{ value} = \quad \text{cm}^{-1}$$

(10 marks)

Sheet V

For the following Free Ions, calculate the value of μ_{S+L} in B.M. unit.

1- Pd^{3+} : μ_{S+L} : B.M

2- Pt^{4+} : μ_{S+L} : B.M

3- Sm^{3+} : μ_{S+L} : B.M

4- Ru^{4+} : μ_{S+L} : B.M

5- Gd^{3+} : μ_{S+L} : B.M

6- W^{4+} : μ_{S+L} : B.M

7- Ho^{3+} : μ_{S+L} : B.M

8- Ir^{4+} : μ_{S+L} : B.M

9- Yb^{3+} : μ_{S+L} : B.M

10- Mo^{3+} : μ_{S+L} : B.M

(20 marks)