

PORTOFOLIO COORDINATION CHEMISTRY

ACADEMIC YEAR 2019/2020 EVEN SEMESTER



**Course Coordinator:
Dr. Amaria, M.Si.**

**Teaching Team:
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**CHEMISTRY DEPARTMENT
FACULTY OF MATHEMATICS AND SCIENCE
UNIVERSITAS NEGERI SURABAYA**

TABLE OF CONTENT

A. SEMESTER LEARNING ACTIVITY PLAN	3
A.1. COURSE IDENTITY	3
A.2. COURSE TOPIC	4
A.3. COURSE PROGRAM	5
A.4. MAPPING OF LEARNING OUTCOMES – COURSE OUTCOMES	9
A.4.1. The Expected Program Learning Outcomes (PLO) of Undergraduate Program of Chemistry (UPC)	9
A.4.2. The Education Program Objectives (PEOs) of Coordination Chemistry.	10
A.4.3. Mapping of Program Learning Outcomes (PLO) – Education Program Objectives (PEOs)	10
B. COURSE ASSESSMENT	10
B.1. Assessment Rubric	10
B.2. Assessment System	10
C. COURSE DEVELOPMENT	11
C.1. Academic Year	11
C.2. Problems Analysis	11
C.3. Solutive Strategy	11
D. APPENDICES	12
D.1. DOCUMENT OF COURSE ACTIVITY	12
D.1.1. Lecture’s journal and student’s attendance form siakadu.uneca.ac.id	12
D.1.2. Sample of statement of examination official report	17
D.2. SAMPLE OF STUDENT WORK	19
D.2.1. Sample of Test Paper	19
D.2.2. Sample of Student’s Work	22
D.3. RECAPITULATION OF ASSESSMENT	30
D.3.1. Validate Test Item	30
D.3.2 Evaluation Results of Coordination Chemistry	30
D.3.3 Percentage of PLO achievements of Coordination Chemistry at Academic Year 2019/2020	32

A. SEMESTER LEARNING ACTIVITY PLAN

A.1. COURSE IDENTITY


Module Name	Coordination Chemistry
Module level	Bachelor
Abbreviation, if applicable	3074212034
Sub-heading, if applicable	-
Course included in the module, if applicable	-
Semester/term	4 th semester/Second Year
Module coordinator(s)	Dr. Amaria, M.Si.
Lecturer(s)	Prof. Dr. Sari Edy Cahyaningrum. M.Si., Dr. Amaria, M.Si. Dina Kartika Maharani, S.Si., M.Sc.
Language	Indonesian
Classification within the curriculum	Compulsory Course
Teaching format/class hours per week during the semester:	2 hours lecturers (50 min per hours)
Workload:	1 CU for bachelor degree equals to 3 workhours per week or 170 minutes (50' face to face learning, 60' structured learning, and 60' independent learning). In one semester, courses are conducted in 14 weeks (excluding mid and end-term exam). Thus, 1 CU equals to 39.67 workhours per semester. One CU equals to 1.587 ECTS.
Credit points:	2 CU x 1.587 = 3.174 ECTS
Prerequisites course(s):	-
Targeted learning outcomes:	CLO1 Understand the concepts of covalent bonds, ligands, stereochemistry, stability, magnetic properties and electronic spectra of coordination compounds. CLO2 Able to draw structures and predict the properties of coordination compounds CLO3 Communicate both verbally and in writing the concept of chemical bonds, stereochemistry, stability, magnetic properties, and electronic spectra of the coordination compound. CLO4 Demonstrate caring attitude and responsibility in applying coordination compounds in the environment
Content:	<ul style="list-style-type: none"> ● The concept of coordination compounds, ● Bond theories, ● Types of ligands, ● Stereochemistry, ● Stability of complex ions, ● Term symbols, ● Multiplicity, ● Orgel diagrams,

	<ul style="list-style-type: none"> • Tanabe-Sugano diagrams of coordination compounds
Study / exam achievements:	<p>Students are considered to be competent and pass if at least get 55</p> <p>Final score is calculated as follows: 20% participation + 30% assignment + 20% middle exam (UTS) & 30% final exam (UAS)</p> <p>Table index of graduation</p> <ul style="list-style-type: none"> • A = 4 (85 ≤ - > 100) • A- = 3,75 (80 ≤ - < 85) • B+ = 3,5 (75 ≤ - < 80) • B = 3 (70 ≤ - < 75) • B- = 2,75 (65 ≤ - < 75) • C+ = 2,5 (60 ≤ - < 65) • C = 2 (55 ≤ - < 60) • D = 1 (40 ≤ - < 55) • E = 0 (0 ≤ - < 40)
Media:	Computer, LCD, White board
Learning Methods	Individuals assignment, group assignment, discussion, presentation
Literature:	<ol style="list-style-type: none"> 1. Basolo, F and Johnson, R.C. 1986. Coordination Chemistry, 2nd Edition. New York: W.A. Benjamin, Inc. 2. Sugiarto, Bambang. 2006. Teori Senyawa Koordinasi. Surabaya: Unesa University Press. 3. Quagliano, J. V. And Vallarino, L. M., 1969. Coordination Chemistry, Massachusetts: D. C. Heath and Company 4. Huheey, E. James, Ellen, A.K, and Richard I.K. 1978. Inorganic Chemistry, Principle of Structure and Reactivity. USA: Harper Collins College Publishers 5. Madan, R.D., 1997. Modern Inorganic Chemistry , S. Chand and Company LTD, New Delhi.

A.2. COURSE TOPIC

The study of the concepts: chemical bonding, stereochemistry, reaction mechanisms, properties, spectra, synthesis and stability of coordination chemistry through discussion, presentation, structured assignments

A.3. COURSE PROGRAM

 UNESA	UNIVERSITAS NEGERI SURABAYA FACULTY OF MATHEMATICS AND NATURAL SCIENCE UNDERGRADUATE PROGRAMME OF CHEMISTRY					Document Code
SEMESTER LEARNING ACTIIVITY PLAN						
COURSE	CODE	Course Group	Credit Unit		Semester	Date
Coordination Chemistry	3074212034	Inorganic Chemistry	2	-	4 th	
AUTHORIZATION CHEMISTRY	Compiler		Coordinator		Head of Study Program	
	Dr. Amaria, M.Si.		Dr. Achmad Lutfi, M.Pd.		Dr. Amaria, M.Si.	
Learning Outcomes	Program Learning Outcomes (PLO)					
	PLO1 (KNO-1)	Capable to demonstrate knowledge related to theoretical concepts about structure, dynamics, and energy, as well as the basic principles of separation, analysis, synthesis and characterization of chemicals				
	PLO5 (COM-1)	Applying logical, critical, systematic and innovative thinking in the context of development or implementation of science, technology, and art that regards and applies humanities in accordance with chemistry education in solving problems				
	Course Learning Outcomes (CLO)					
	CLO1	Understand the concepts of covalent bonds, ligands, stereochemistry, stability, magnetic properties and electronic spectra of coordination compounds.				
	CLO2	Draw structures and predict the properties of coordination compounds				
	CLO3	communicate both verbally and in writing the concept of chemical bonds, stereochemistry, stability, magnetic properties, and electronic spectra of the coordination compound.				
	CLO4	Demonstrate caring attitude and responsibility in applying coordination compounds in the environment				
	Sub CLO					
	Sub-CLO1	Understand the development of bond theory concepts in coordination compounds				
	Sub-CLO2	Apply the various bond theories in coordination compounds				
	Sub-CLO3	Describe the geometry and isomers of coordination compounds				
Sub-CLO4	Understand the stability of the coordination compound complex					
Sub-CLO5	Understand Term Symbols, Multiplicity, Orgel Diagrams, and Tanabe-Sugano diagrams of coordination compounds					

Brief Description of the Course	The study of the concepts: chemical bonding, stereochemistry, reaction mechanisms, properties, spectra, synthesis and stability of coordination chemistry through discussion, presentation, structured assignments						
Study Materials: Learning Materials	The concept of coordination compounds, bond theories, types of ligands, stereochemistry, stability of complex ions, term symbols, multiplicity, Orgel diagrams, and Tanabe-Sugano diagrams of coordination compounds						
Reference	Main :						
	<ol style="list-style-type: none"> Basolo, F and Johnson, R.C. 1986. Coordination Chemistry, 2nd Edition. New York: W.A. Benjamin, Inc. Sugiarto, Bambang. 2006. Teori Senyawa Koordinasi. Surabaya: Unesa University Press. 						
Reference	Additional :						
	<ol style="list-style-type: none"> Quagliano, J. V. And Vallarino, L. M., 1969. Coordination Chemistry, Massachusetts: D. C. Heath and Company Huheey, E. James, Ellen, A.K, and Richard I.K. 1978. Inorganic Chemistry, Principle of Structure and Reactivity. USA: Harper Collins College Publishers Madan, R.D., 1997. Modern Inorganic Chemistry , S. Chand and Company LTD, New Delhi. 						
Lecturer	Prof. Dr. Sari Edy Cahyaningrum. M.Si., Dr. Amaria, M.Si., Dina Kartika Maharani, S.Si., M.Sc.						
Prerequisite courses	-						
Meeting	The final ability of each activity	Assessment		Learning Forms, Learning Methods, Student Assignment		Reference	Rating Weight (%)
		Indicator	Criteria & Form	Offline	online		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Understand the properties, development and nomenclature of coordination compounds	<ol style="list-style-type: none"> Distinguish between double salt and coordination compound Describe the development and nomenclature of coordination compounds. 	Essay writing test	<ul style="list-style-type: none"> Lecture Discussion Exercises 1x2x50 minutes 	-	Coordination compound concept (Reference number 1, 2 & 5)	10
2	Apply the various bond theories in coordination compounds	<ol style="list-style-type: none"> Apply the concept of electron pair bonding 	Essay writing test	<ul style="list-style-type: none"> Lecture Discussion Exercises 	-	Electron pair bonds	20

		2. Apply the concept of Effective Atomic Number		- 1x2x50 minutes		(Reference number 1 &2)	
3-4	Apply the various bond theories in coordination compounds	1. Apply Valence Bond Theory 2. Apply Cristal Field Theory	Essay writting test	- Lecture - Discussion - exercises - 2x2x50 minutes	-	Valence Bond Theory (Reference number 1 & 2)	
5-7	Apply the various bond theories in coordination compounds	1. Explain the advantages of molecular orbital theory over crystal field theory in coordination compounds 2. Apply molecular orbital theory to prove the paramagnetic properties of coordination compounds 3. Apply molecular orbital theory to prove the strength of bonds in coordination compounds	Essay writting test	- Lecture - Direct Instruction Model - Discussion - Exercises - 3x2x50 minutes	-	Molecular Orbital Theory (Reference number 1, 2 &3)	10
8	Mid-Term Exam						
9	Understand the geometry and isomers of coordination compounds	1. Describe the various type of isomers in coordination compounds 2. Determine the geometrical isomers of coordination compound 3. Determine the optically active isomers of coordination compound	Essay writting test	- Lecture - Direct Instruction Model - Discussion - Exercises - 1x2x50 minutes	-	Coordination compounds Isomers (Reference number 1, 2 & 5)	20

10-11	Understand the determinant factors of coordination compound stability	<ol style="list-style-type: none"> Describe the differences of the thermodynamic and kinetic complex stability Write down the reaction steps of formation reaction and writing the stability constant of coordination compound Describe the factors that affect the stability constant 	Essay writing test	<ul style="list-style-type: none"> Lecture Cooperatif Learning Model Discussion Exercises 2x2x50 minutes 	-	Stability of coordination compound (Reference number 1, 2 & 3)	20
12	Understand Term Symbols, Multiplicity, Orgel Diagrams, and Tanabe-Sugano Diagrams	Describe the Term Symbols	Essay writing test	<ul style="list-style-type: none"> Lecture Cooperatif Learning Model Discussion Exercises 1x 2x50 minutes 	-	Term symbol (Reference number 5)	20
13	Understand Term Symbols, Multiplicity, Orgel Diagrams, and Tanabe-Sugano Diagrams	Describe the multiplicity	Essay writing test	<ul style="list-style-type: none"> Lecture Cooperatif Learning Model Discussion Exercises 1x2x50 minutes 	-	Multiplicity (Reference number 5)	
14-15	Understand Term Symbols, Multiplicity, Orgel Diagrams, and Tanabe-Sugano Diagrams	Describe the Orgel Diagrams, and Tanabe-Sugano Diagrams	Essay writing test	<ul style="list-style-type: none"> Lecture Cooperatif Learning Model Discussion Exercises 1x2x50 minutes 	-	Orgel Diagram & Tanabe-Sugano Diagram (Reference number 5)	
16	Final Exams						100

A.4. MAPPING OF LEARNING OUTCOMES – COURSE OUTCOMES

A.4.1. The Expected Program Learning Outcomes (PLO) of Undergraduate Program of Chemistry (UPC)

ASPECTS	PLO	CODE
KNOWLEDGE	1. Able to master the concepts of structure, dynamics and energy, as well as the basic principles of separation, analysis, synthesis, and characterization of micromolecular compounds and their applications	KNO-1
	2. Able to master the basic principles and knowledge of how to operationalize instruments for the analysis and characterization of compounds, as well as utilizing ICT for modeling more specific molecules	KNO-2
SKIL	3. Able to master the principles of Occupational Health and Safety, manage laboratories and use their equipment, and operate instrumental of chemistry	SKI-1
	4. Able to design an activity to solve problems by implementing capabilities in the field of chemistry that refers to ecopreunership	SKI-2
COMPETENCIES	5. Able to apply logical, critical, systematic and innovative thinking in the context of the development or implementation of science and technology by observe and applying the value of humanities in accordance with the field of chemistry in solving problems	COM-1
	6. Able to master the basics of the scientific method, designing and conducting research, compiling scientific reports and communicating them both verbally and in writing by utilizing information and communication technology	COM-2
ATTITUDE AND SOCIAL	7. Able to build teamwork and have entrepreneurial skills that are environmental perspective, and make the right, honest and responsible decisions in solving problems of chemistry and have social sensitivity as a obligation of citizens and religious communities	SOC-1
	8. Able to adapt to various developments in chemistry, continue to develop and learn throughout long-life education, both formal and nonformal	SOC-2

A.4.2. The Education Program Objectives (PEOs) of Coordination Chemistry

PEO 2. Obtaining higher order thinking skills to communicate ideas both spoken and written, being able to initiate and to make a good decision as well as having an ability to lead within a group project in a relevant field.

PEO 5. Having capability to develop and apply chemistry concept along with the progress of science and technology as well as humanities values.

A4.3. Mapping of Program Learning Outcomes (PLO) – Education Program Objectives (PEOs)

	PLO 1 (KNO-1)	PLO5 (COM-1)
PEO 2	√	√
PEO 5	√	√

B. COURSE ASSESSMENT

B.1. Assessment Rubric

Cognitive Criteria

1. The ability to give answers correctly
2. The ability to provide argumentation according to theory
3. The ability to provide systematic explanations
4. The ability to solve problems comprehensively

B.2. Assessment System

Final Assessment Course without practicum

Practicum : 0%

Group/Individuals Assignment : 30%

Midterm examination : 30%

Final examination : 40%

Distribution of the weight of the ability of the test item

	PLO 1 (KNO-1)	PLO5 (COM-1)	Total
Practicum	0%	0%	0%
Group/Individuals Assignment	40%	60%	100%
Midterm examination	50%	50%	100%
Final examination	40%	60%	100%

Success Criteria of Program Learning Outcomes (PLO)

Excellent	≥ 80
Good	≥ 70
Satisfy	≥ 55
Failed	< 55

Final index for undergraduate program defined as follow:

Final Index	Range
A	4 (85 ≤ - > 100)
A ⁻	3,75 (80 ≤ - < 85)
B ⁺	3,5 (75 ≤ - < 80)
B	3 (70 ≤ - < 75)
B ⁻	2,75 (65 ≤ - < 70)
C ⁺	2,5 (60 ≤ - < 65)
C	2 (55 ≤ - < 60)
D	1 (40 ≤ - < 55)
E	0 (0 ≤ - < 40)

C. COURSE DEVELOPMENT

C.1. Academic Year 2019/2020

Parameter	∑ of person	Percentage
Number of students taking this subject	65	100%
Number of students who pass at first attempt (>B ⁻)	65	100%
Number of students who pass at first attempt (C ≥ - ≤ B ⁻)	-	0%
Number of failed students after remedial (D & E)	-	0%

C.2. Problems Analysis

At 2019/2020 academic year in the Coordination Chemistry course, there were 100% of students who had passed the examination at the first attempt. At the end of the semester examination, there is no remedial. There is one student who did not graduate because the student did not take the final exam and collecting assignments. Although the score is already fine, it was thought that the learning strategy/methods still need to be improved to achieve higher results in the future. The average final score in 2019/2020 good even the students have different characteristics, unable to cooperate with their group and not serious when doing the task.

C.3. Solutive Strategy

New teaching and learning methods should be developed for the next academic years, consisting of:

1. Redesigning the course material (PPT slides, course contents, etc.) to become more interesting and interactive to stimulate student's interest in this course.
2. Giving "lecture by online" to stimulate our students to learn about the next lecture topics.
3. Enhance the cooperative skills of students with exchange the methods and models of learning

D. APPENDICES

D.1. DOCUMENT OF COURSE ACTIVITY

D.1.1. Lecture's journal and student's attendance form siakadu.uneca.ac.id

6/19/2021

SIAKADU: Cetak Jurnal Perkuliahan



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Aktivitas Perkuliahan

Nama Matakuliah : Kimia Anorganik II: Koordinasi

Dosen :

SARI EDI CAHYANINGRUM

(197012291997022001)

Kelas : 2018A

DINA KARTIKA MAHARANI

(198206062005012003)

Jadwal & Ruang : C05.02.01 (07.00 - 08.40) R.

AMARIA (196406291991012001)

No.	Tanggal	Pertemuan	Topik	Peserta	Status	Dosen	Kesesuaian	Saran
1	03-02-2020	Pertemuan ke 1	1. Pendahuluan 2. Kontrak belajar. 3. Komponen penilaian 4. Konsep senyawa koordinasi	33	Terjadwal	Sari Edi Cahyaningrum		
2	10-02-2020	Pertemuan ke 2	tatanama senyawa koordinasi	34	Terjadwal	Sari Edi Cahyaningrum		
3	17-02-2020	Pertemuan ke 3	Teori Ikatan	34	Terjadwal	Sari Edi Cahyaningrum		
4	24-02-2020	Pertemuan ke 4	Teori Ikatan	33	Terjadwal	Sari Edi Cahyaningrum		
5	02-03-2020	Pertemuan ke 5	Teori Ikatan	34	Terjadwal	Amaria		
6	09-03-2020	Pertemuan ke 6	Teori Orbital Molekul pd Senyawa Koordinasi:Kelebihan teori orbital molekul dibandingkan Teori medan Kristal & Teori Ikatan Valensi	28	Terjadwal	Amaria		
7	16-03-2020	Pertemuan ke 7	Teori Orbital Molekul Senyawa Koordinasi	34	Terjadwal	Amaria		
8	23-03-2020	Pertemuan ke 8	UTS bahan kajian pertemuan 1-7	34	Terjadwal	Amaria		
9	30-03-2020	Pertemuan ke 9	Kestabilan Senyawa Koordinasi	34	Terjadwal	Amaria		
10	06-04-2020	Pertemuan ke 10	Isomerisasi Senyawa Koordinasi	34	Terjadwal	Amaria		
11	13-04-2020	Pertemuan ke 11	Isomerisasi Senyawa Koordinasi	34	Terjadwal	Amaria		
12	20-04-2020	Pertemuan ke 12	Spektra elektronik	34	Terjadwal	Dina Kartika Maharani		
13	27-04-2020	Pertemuan ke 13	Teori transisi elektronik	34	Terjadwal	Dina Kartika Maharani		
14	04-05-2020	Pertemuan ke 14	Deret spektrokimia	34	Terjadwal	Dina Kartika Maharani		
15	11-05-2020	Pertemuan ke 15	Kemagnetan	34	Terjadwal	Dina Kartika Maharani		



KEMENTERIAN RISET, TEKNOLOGI, DAN PENDIDIKAN TINGGI
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Aktivitas Perkuliahan

Nama Matakuliah : Kimia Anorganik II: Koordinasi

Dosen :

SARI EDI CAHYANINGRUM
(197012291997022001)

Kelas : 2018B

DINA KARTIKA MAHARANI

Jadwal & Ruang : C06.04.01-B (07.00 - 08.40) R.

(198206062005012003)

AMARIA (196406291991012001)

No.	Tanggal	Pertemuan	Topik	Peserta	Status	Dosen	Kesesuaian	Saran
1	05-02-2020	Pertemuan ke 1	1. Pendahuluan 2. Kontrak belajar. 3. Komponen penilaian 4. Konsep senyawa koordinasi	31	Terjadwal	Sari Edi Cahyaningrum		
2	12-02-2020	Pertemuan ke 2	tatanama senyawa koordinasi	31	Terjadwal	Sari Edi Cahyaningrum		
3	19-02-2020	Pertemuan ke 3	Teori Ikatan	30	Terjadwal	Sari Edi Cahyaningrum		
4	26-02-2020	Pertemuan ke 4	Teori Ikatan	31	Terjadwal	Sari Edi Cahyaningrum		
5	04-03-2020	Pertemuan ke 5	Teori Ikatan	31	Terjadwal	Sari Edi Cahyaningrum		
6	11-03-2020	Pertemuan ke 6	Teori ikatan: Teori orbital Molekul pada senyawa koordinasi	27	Terjadwal	Amaria		
7	18-03-2020	Pertemuan ke 7	Teori ikatan: Teori orbital Molekul pada senyawa koordinasi	31	Terjadwal	Amaria		
8	25-03-2020	Pertemuan ke 8	Ujian Tengah Semester	31	Terjadwal	Amaria		
9	01-04-2020	Pertemuan ke 9	Kestabilan Senyawa koordinasi	31	Terjadwal	Amaria		
10	08-04-2020	Pertemuan ke 10	Isomerisasi Senyawa koordinasi	31	Terjadwal	Amaria		
11	15-04-2020	Pertemuan ke 11	Isomerisasi Senyawa Koordinasi	31	Terjadwal	Amaria		

12	22-04-2020	Pertemuan ke 12	Spektra elektronik	31	Terjadwal	Dina Kartika Maharani		
13	29-04-2020	Pertemuan ke 13	Teori transisi elektronik	31	Terjadwal	Dina Kartika Maharani		
14	06-05-2020	Pertemuan ke 14	Deret spektrokimia	31	Terjadwal	Dina Kartika Maharani		
15	13-05-2020	Pertemuan ke 15	Kemagnetan	31	Terjadwal	Dina Kartika Maharani		



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PRESENSI KULIAH
Periode 2019/2020 Genap

Mata Kuliah : Kimia Anorganik II: Koordinasi
Kelas : 2018A
Prodi : S1 Kimia

Dosen : Prof. Dr. Sari Edi Cahyaningrum, M.Si.
Dina Kartika Maharani, S.Si., M.Sc.
Dr. Amaria, M.Si.

No	NIM	Nama Mahasiswa	Pertemuan Ke															%
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
			03 Feb 20	10 Feb 20	17 Feb 20	24 Feb 20	02 Mar 20	09 Mar 20	16 Mar 20	23 Mar 20	30 Mar 20	06 Apr 20	13 Apr 20	20 Apr 20	27 Apr 20	04 May 20	11 May 20	
1.	18030234001	KURROTU AINI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
2.	18030234002	LAILA AYUNI HIDAYAH	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
3.	18030234004	FARIDA DWI OKTAVIA	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
4.	18030234005	AWANDA HALIDA RAMADANTI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
5.	18030234006	NITA SUTANTO	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
6.	18030234007	NANDA REVITA DWI LESTARI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
7.	18030234008	RIFANDA VIANIANO HARSONO	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
8.	18030234009	YOSSY NUR ANNISA	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
9.	18030234019	RISKA AMELIA LAWARTI	H	H	H	H	H	A	H	H	H	H	H	H	H	H	H	93.3 %
10.	18030234022	AMANATUR ROVIQOH	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
11.	18030234023	ELSA RISHDA HARININGTIAS	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
12.	18030234024	FASTABIQUL KHAIRATI RHAMDIYAH	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
13.	18030234025	ACHMAD FITRIADI AKBAR	H	H	H	H	H	S	H	H	H	H	H	H	H	H	H	100 %
14.	18030234026	ARMY DEWI CAHYANTI	H	H	H	H	H	S	H	H	H	H	H	H	H	H	H	100 %
15.	18030234027	INTAN FATMA LISTIANDARI	H	H	H	H	H	A	H	H	H	H	H	H	H	H	H	93.3 %
16.	18030234028	FAIZAH RYANITA PUTRI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
17.	18030234029	GORA FAHMAN	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
18.	18030234030	HIDAYATUL MAULIDA FATIKHUROKHMMAH	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
19.	18030234031	ARDHIA PRAMESTI RIGITA	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
20.	18030234032	DHEA RAHMADANY PRASASTI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
21.	18030234033	HENDRIK HARISMAN	A	H	H	A	H	A	H	H	H	H	H	H	H	H	H	80 %
22.	18030234041	FIKALIAH KUSNANDAR RIRIN ULI RIRWU	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
23.	18030234046	GIA RAHAYU NINGSIH	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
24.	18030234048	SEVILA DESTY ANGGRIANI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
25.	18030234052	DEDY ABURIZAL KHUSWANTO	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
26.	18030234053	SHETYA ATRIYANI ERSYADA	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
27.	18030234054	ADELLA MELUTIA GHIASSANI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
28.	18030234055	ANNISA FAUZIAH ZAIN	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
29.	18030234056	RISKA NUR SAFITRI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
30.	18030234057	SITI NUR MUFIDA	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
31.	18030234058	TIARA RAHMAWATI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
32.	18030234059	TRI DYAH ANDIANITA	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
33.	18030234060	ALFITA DHURROTUL LU'MA	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
34.	18030234070	KHOLILUR ROCHMAN	H	H	H	H	H	A	H	H	H	H	H	H	H	H	H	93.3 %
Tanda Tangan Dosen / Asisten																		



KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
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Faksimile : +6231-99424932
e-mail : bakpk@unesa.ac.id

PRESENSI KULIAH
Periode 2019/2020 Genap

Mata Kuliah : Kimia Anorganik II: Koordinasi
Kelas : 2018B
Prodi : S1 Kimia

Dosen : Prof. Dr. Sari Edi Cahyaningrum, M.Si.
Dina Kartika Maharani, S.Si., M.Sc.
Dr. Amaria, M.Si.

No	NIM	Nama Mahasiswa	Pertemuan Ke															%
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
			05 Feb 20	12 Feb 20	19 Feb 20	26 Feb 20	04 Mar 20	11 Mar 20	18 Mar 20	25 Mar 20	01 Apr 20	08 Apr 20	15 Apr 20	22 Apr 20	29 Apr 20	06 May 20	13 May 20	
1.	18030234010	LUTFIAH BERLIANTI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
2.	18030234011	NABELLA DWITARANI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
3.	18030234012	HILYATUL MALIKHAH	H	H	A	H	H	H	H	H	H	H	H	H	H	H	H	93.3 %
4.	18030234014	ALVIRA RAHMADANI PUTRI	H	H	H	H	H	A	H	H	H	H	H	H	H	H	H	93.3 %
5.	18030234015	DIANA KHOLIDA	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
6.	18030234016	YAYUK PUJJI LESTARI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
7.	18030234017	AMISA KURNIA SARI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
8.	18030234018	TAHTA ALFI NAHDIYAH	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
9.	18030234020	NUR LAILIYAH	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
10.	18030234034	NABILA ESTIANI ALSARI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
11.	18030234035	INDAH TRI WAHYUNI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
12.	18030234036	MAREIDHA NANDA DEWI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
13.	18030234037	TITIK MARDIYANTI SOFYAH	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
14.	18030234038	HESTI SRI PREHATINI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
15.	18030234039	RIZKY ABDUR RAHMAN	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
16.	18030234040	IVAN NANDASYAH	H	H	H	H	H	A	H	H	H	H	H	H	H	H	H	93.3 %
17.	18030234042	MOHAMMAD FAKHRUL MUFID	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
18.	18030234044	QONITA ARKY HAFIDHA	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
19.	18030234045	PUTRI AZIZAH KURNIA FATAH	H	H	H	H	H	S	H	H	H	H	H	H	H	H	H	100 %
20.	18030234049	FILZA QURROTA AINI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
21.	18030234050	RAFIQI RAJAUDDIN AMIN	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
22.	18030234051	ERCA HARIYANA	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
23.	18030234061	NAVIRRA AYU KHUDZAIFAH	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
24.	18030234062	DINDA KOESWANTIKA PUTRI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
25.	18030234063	ERVINA RETNANINGTYAS INDARWATI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
26.	18030234064	NUR ISLAHAH	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
27.	18030234065	KAYLA NAULIA FADHILA	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
28.	18030234066	RIZKA BELLA ANDRIANI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
29.	18030234067	NABILA ALMIRA	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
30.	18030234068	ADITYA ARIF BUDIMAN	H	H	H	H	H	A	H	H	H	H	H	H	H	H	H	93.3 %
31.	18030234069	TRISNA NUR JAFAR	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
Tanda Tangan Dosen / Asisten																		

D.1.2. Sample of statement of examination official report



KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
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FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM
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Faksimile : +6231- 8298761
e-mail kimia@unesa.ac.id

BERITA ACARA UJIAN AKHIR SEMESTER

Pada hari ini Senin, tanggal 11 Mei 2020, telah dilaksanakan Ujian Akhir Semester (UAS) daring Semester Genap 2019 – 2020 via *Google Classroom*. Ujian dimulai pukul 12.00 dan di akhiri pukul 13.40 selama 100 menit.

Program Studi : S1 Kimia
Mata Kuliah yang diujikan : Kimia Anorganik II: Koordinasi
Kelas : Kimia 2018A
Dosen Pengampu : Tim

Jumlah Peserta : 34 orang
Jumlah Hadir : 34 orang
Jumlah Tidak Hadir : 0 orang, yaitu

1. 4. 7.
2. 5. 8.
3. 6. 9.

Kejadian selama ujian berlangsung.

Ada beberapa mahasiswa yang mengirimkan jawaban lebih dari satu kali dan beberapa format nama file tidak sesuai.

Nama Pengawas : 1. -
2. -
3. -
4. -

Tanda Tangan : 1. -
2. -
3. -
4. -

Demikian Berita Acara Ujian Akhir Semester

Ditetapkan di : Surabaya
Pada tanggal : 11 Mei 2020
Panitia Ujian Akhir Semester Genap 2019/2020

Jurusan Kimia⁰¹

Dr. Mitarlis, S.Pd., M.Si.
NIP 197002041994032001

Tembusan :

1. Berita acara ini dibuat rangkap dua untuk jurusan 1 lembar dan fakultas 1 lembar



KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
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Program Studi : S1 Kimia
Mata Kuliah yang diujikan : Kimia Anorganik II: Koordinasi
Kelas : Kimia 2018B
Dosen Pengampu : Tim

Jumlah Peserta : 31 orang
Jumlah Hadir : 31 orang
Jumlah Tidak Hadir : 0 orang, yaitu

1. 4. 7.
2. 5. 8.
3. 6. 9.

Kejadian selama ujian berlangsung.

Ada beberapa mahasiswa yang mengirimkan jawaban lebih dari satu kali dan beberapa format nama file tidak sesuai.

Nama Pengawas :	1. -	Tanda Tangan :	1. -
	2. -		2. -
	3. -		3. -
	4. -		4. -

Demikian Berita Acara Ujian Akhir Semester

Ditetapkan di : Surabaya
Pada tanggal : 11 Mei 2020
Panitia Ujian Akhir Semester Genap 2019/2020

Jurusan Kimia⁰¹

Dr. Mitarlis, S.Pd., M.Si.
NIP 197002041994032001

Tembusan :

1. Berita acara ini dibuat rangkap dua untuk jurusan 1 lembar dan fakultas 1 lembar

D.2. SAMPLE OF STUDENT WORK

D.2.1. Sample of Test Paper



KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
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SOAL UJIAN TENGAH SEMESTER GENAP 2019/2020

Mata Ujian	: Kimia Anorganik II: Koordinasi
Jurusan/Fakultas	: Kimia / MIPA
Program/Angkatan	: Kimia / 2018
Hari/Tanggal	: Rabu / 23 Maret 2020
Waktu	: 12.00 – 13.40 (100 menit pengerjaan + 20 menit upload jawaban)
Dosen	: Tim
Sifat Ujian	: Open Book/Source

1. Beberapa teori menjelaskan terbentuknya warna (spektra) dan kemagnetan pada senyawa kompleks. Bagaimana teori –teori menjelaskan hal tersebut dan factor yang mempengaruhi ? (SKOR 25)
2. Ligan CN- dan Cl mempunyai kekuatan yang berbeda dalam menjalankan fungsinya sebagai ligan. Bagaimana karakter kedua ligan tersebut? (SKOR 25)
3. Hitung jumlah elektron yang tidak berpasangan untuk masing-masing senyawa: (SKOR 25)
 - a. $[\text{Co}(\text{OH})_6]^{2-}$
 - b. $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$
4. Bagaimana proses hibridisasi senyawa berikut? Bagaimana kemagnetannya? Jelaskan jawaban saudara dan hitung momen magnetiknya! (NA Co= 27) (SKOR 25)
 - a. $[\text{Co}(\text{NH}_3)_6]^{3+}$
 - b. $[\text{Co F}_6]^{3-}$



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SOAL UJIAN AKHIR SEMESTER GENAP 2019/2020

Mata Ujian	: Kimia Anorganik II: Koordinasi
Jurusan/Fakultas	: Kimia / MIPA
Program/Angkatan	: Kimia / 2018
Hari/Tanggal	: Senin / 11 Mei 2020
Waktu	: 12.00 – 13.40 (100 menit pengerjaan + 20 menit upload jawaban)
Dosen	: Tim
Sifat Ujian	: Open Book/Source

Jawablah Pertanyaan-Pertanyaan di Bawah ini !

Petunjuk :

1. Kerjakan soal UAS pada lembar kertas ditulis tangan kemudian fotolah jawaban soal dan diupload dalam bentuk file pdf yang sudah digabung untuk semua nomor jawaban.
2. Bagian A dan B dikerjakan terpisah dan diupload terpisah

Bagian A

1. Tunjukkan isomerisasi struktur yang mungkin terjadi untuk kompleks dengan rumus molekul:
a) $[\text{Co}(\text{NH}_3)_5(\text{NO}_2)]^{2+}$ b) $\text{CoBr}(\text{NH}_3)_3\text{SO}_4$ (Skor 6)
2. Tulislah rumus senyawa koordinasi suatu kompleks dari rumus sederhana $\text{CoCl}_3 \cdot 5\text{NH}_3 \cdot \text{H}_2\text{O}$ (senyawa I), berdasarkan bukti-bukti berikut. Padatan dan larutannya dalam air, berwarna pink. Penambahan larutan AgNO_3 menghasilkan endapan AgCl , dan dari sisa larutannya suatu kompleks baru, $\text{Co}_3\text{NO}_3 \cdot 5\text{NH}_3 \cdot \text{H}_2\text{O}$. Daya hantar listrik, larutannya dalam air (senyawa I) dengan konsentrasi yang sama, mirip dengan larutan $\text{Fe}(\text{NO}_3)_3$. Bila dipanaskan pada suhu 100°C , senyawa I melepaskan H_2O dan dihasilkan senyawa yang berwarna violet dengan rumus sederhana $\text{CoCl}_3 \cdot 5\text{NH}_3$. Setelah anda menganalisis dari bukti-bukti tersebut, nyatakan rumus senyawa koordinasinya dan deteksilah termasuk jenis isomer apa ! (skor 10)
3. a. Gambarlah isomer geometri untuk kompleks berikut
(i) ion bis(etilenadiamina) dikloro kobalt(III) (ii) ion aquo tetraamina kloro kromium(III)
(iii) $[\text{Pt}(\text{NH}_3)(\text{NH}_2\text{C}_2\text{H}_5)(\text{NH}_2\text{C}(\text{CH}_3)_2\text{CH}_2\text{NH}_2)]$
b. Gambarlah pula isomer mana yang menunjukkan sifat optis aktif ! (Skor 12)
4. Perhatikan potensial elektroda kompleks besi dan kobalt, pada tabel bawah ini!. Kemukakan tentang kestabilan kompleks dan faktor yang mempengaruhinya, dengan mengamati dan menganalisis nilai potensial elektroda kompleks besi dan kobalt (skor 10)



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Potensial elektroda kompleks besi dan kobalt

Reaksi	Potensial elektroda (volts)
$[\text{Fe}(\text{H}_2\text{O})_6]^{3+} + e \rightarrow [\text{Fe}(\text{H}_2\text{O})_6]^{2+}$	0.77
$[\text{Fe}(\text{CN})_6]^{3-} + e \rightarrow [\text{Fe}(\text{CN})_6]^{4-}$	0.37
$[\text{FeEDTA}]^- + e \rightarrow [\text{FeEDTA}]^{2-}$	-0.12
$[\text{Co}(\text{H}_2\text{O})_6]^{3+} + e \rightarrow [\text{Co}(\text{H}_2\text{O})_6]^{2+}$	1.84
$[\text{Co}(\text{NH}_3)_6]^{3+} + e \rightarrow [\text{Co}(\text{NH}_3)_6]^{2+}$	0.10

5. Diketahui, konstanta kestabilan reaksi: $\text{Cd}^{2+} + 4 \text{NH}_3 \rightleftharpoons [\text{Cd}(\text{NH}_3)_4]^{2+}$ pada 30°C adalah $K_1 = 4,47 \times 10^2$, $K_2 = 1,26 \times 10^2$, $K_3 = 2,75 \times 10$, $K_4 = 8,51$.
- Berikan penjelasan anda terhadap kecenderungan penurunan nilai K tersebut!
 - Hitunglah harga β_4 untuk kompleks $[\text{Cd}(\text{NH}_3)_4]^{2+}$
 - Hitunglah harga $\Delta G^\circ_1(303\text{K})$ (Tulis dulu reaksi dan K pada tahap 1) (Skor 12)

Bagian B

- Jelaskan yang dimaksud dengan spectra elektronik d-d pada senyawa kompleks! (skor 5)
- Jelaskan macam-macam transisi elektronik pada senyawa kompleks dan berikan contoh senyawa kompleksnya! (skor 15)
- Jelaskan perbedaan vibronic coupling (vibrasi molekuler) untuk kompleks oktahedral dan tetrahedral? (skor 20)
- Jelaskan warna yang terbentuk pada senyawa kompleks $\text{Cu}(\text{H}_2\text{O})_6\text{Cl}_2$ yang menyerap sinar pada λ 680 nm dan $\text{Ni}(\text{NH}_3)_6\text{Cl}_2$ yang menyerap sinar pada λ 570 nm! Hitung energi masing-masing senyawanya! (skor 20)
- Jelaskan tentang deret spektrokimia berdasarkan teori CFT dan MOT! (skor 20)
- Berapa harga momen magnetik senyawa $[\text{Cr}(\text{en})_3]\text{Br}_2$ untuk high spin dan low spin? (NA Cr = 24) (skor 20)

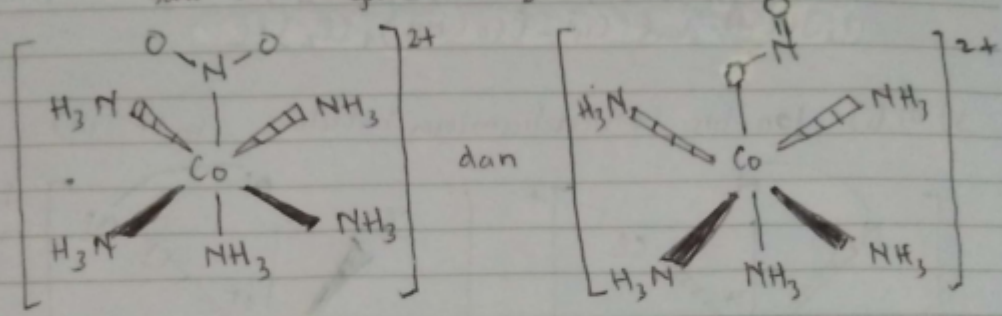
D.2.2. Sample of Student's Work

Nabila Esthani Alsari
 KB 2018 / 18030234034

VAS Kimia Anorganik II Bagian A

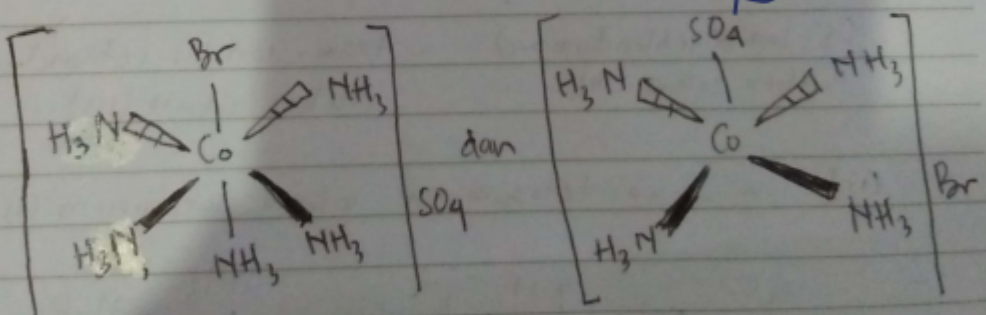
82

i). a). $[Co(NH_3)_5(NO_2)]^{2+}$
 memiliki isomer linkage karena terdapat ligan NO_2 yang mampu berkoordinasi dalam lebih dari satu cara yaitu NO_2^- dan ONO^-



dan

b). $[CoBr(NH_3)_5]SO_4$
 memiliki isomer ionisasi yaitu: $[CoSO_4(NH_3)_5]Br$



dan

• $[CoBr(NH_3)_5]SO_4 \rightleftharpoons [Co(NH_3)_5Br]^{2+} + SO_4^{2-}$
 • $[CoSO_4(NH_3)_5]Br \rightleftharpoons [Co(NH_3)_5SO_4]^{2+} + Br^-$

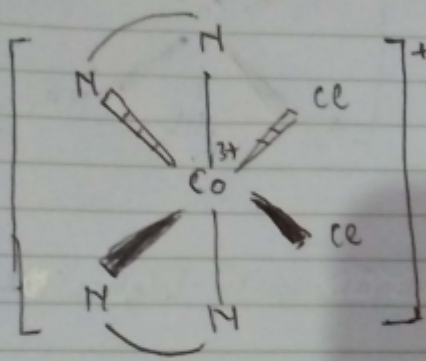
dee

2). Rumus struktur : $[Co(NH_3)_5Cl]Cl_2$

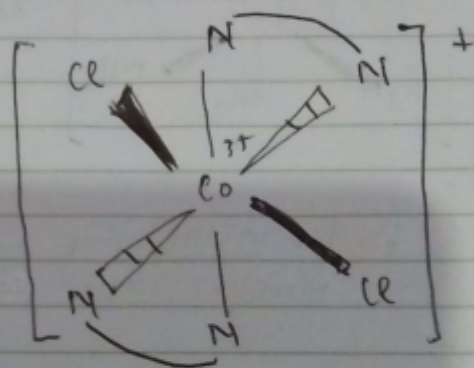
Termasuk isomer hidrat, diantaranya:

$[Co(NH_3)_6]Cl_3$, $[Co(NH_3)_5Cl]Cl_2$, dan $[Co(NH_3)_4Cl_2]Cl$.

3). a). (i) Ion bis (etilendiamina) dikloro kobalt (III).

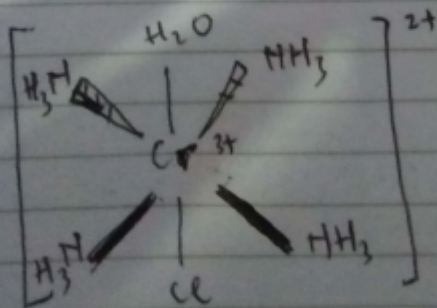


Cis - Ion bis (etilendiamina) dikloro kobalt (III).

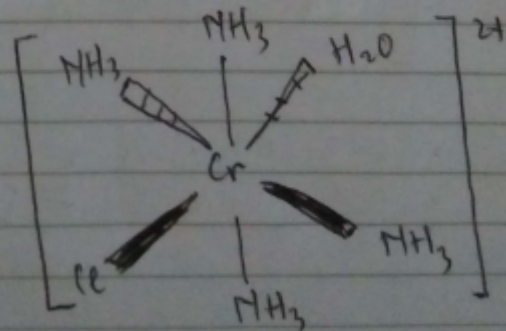


trans - Ion bis (etilendiamina) dikloro kobalt (III).

(ii) Ion aquo tetraamina kloro kromium (III)



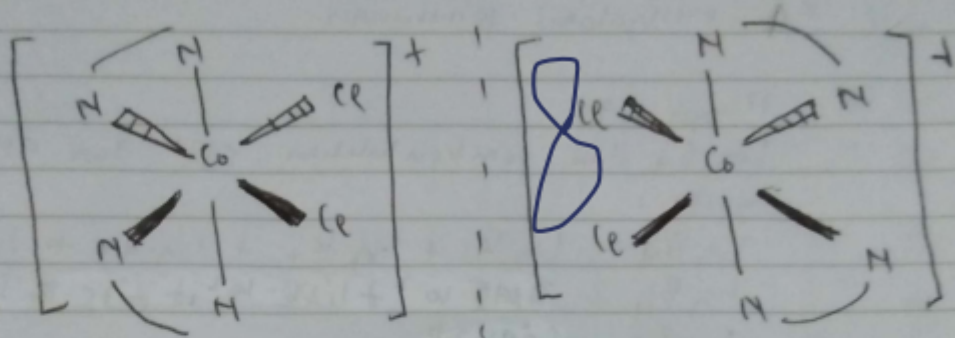
Cis - Ion aquo tetraamina kloro kromium (III).



trans - Ion aquo tetraamina kloro kromium (III)

cii) $(PtClH_3)(NH_2)_2(H_2O)$ $\{NH_2(CH_2)_2(CH_2NH_2)\}$
tidak memiliki isomer geometri.

b). Isomer optik
ion bis (etilendiamina) diokso kobalt (III).



- 4). Faktor yang mempengaruhi kestabilan kompleks :
- Semakin besar biloks logam inti maka semakin stabil
 - Semakin kecil jari-jari ion logam inti maka semakin stabil
 - Berdasarkan tabel potensial elektroda kompleks Fe dan Co, semakin besar efek medan kristal maka semakin stabil ion kompleks tersebut. Efek medan kristal $Fe < Co$.
 - Berdasarkan tabel
 - $Fe(H_2O)_6^{2+}$ stabil karena memiliki ligan yang cenderung terhadap H^+
 - $[Fe(EDTA)]^{2-}$ stabil karena memiliki efek kelat yang besar

Date

$$K_1 = 4,47 \cdot 10^2, K_2 = 1,26 \cdot 10^2, K_3 = 2,15 \cdot 10, K_4 = 8,5$$

5) (a) Nilai K turun dikarenakan penambahan dari 4 kelompok ligan NH_3 kepada logam Cd menunjukkan sampel yang ditemukan untuk sebagian besar konstanta pembentukan, maka dari itu secara berturut-turut konstanta stabilitas dari K_1 sampai K_4 mengalami penurunan

(b) Harga B_4

$\log B_4$ dari pembentukan Cd^{2+} dan 4NH_3

yaitu:

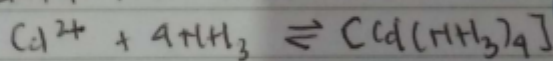
$$\log B_4 = \log K_1 + \log K_2 + \log K_3 + \log K_4$$

$$\log B_4 = 2,65 + 2,1003 + 1,939 + 0,925$$

$$\log B_4 = 7,6143$$

$$B_4 = 13,149 \cdot 10^6$$

(c) ΔG° ?



$$K_1 = 4,47 \cdot 10^2$$

$$\Delta G^\circ (303\text{K}) = -RT \ln K$$

$$= -8,314 \text{ J mol}^{-1} \cdot 303 \text{ K} \cdot \ln 4,47 \cdot 10^2$$

$$= -15,373,211 \text{ Joule}$$

$$= -15,3732 \text{ kJ} \cdot (\text{spontan})$$

Nabila Estiani Alvari

KB 2018 / 18020234034

82

UAS Kimia Anorganik & Bagian B.

1). Transisi dalam tingkat energi orbital d ion logam / transisi d-d.

Sebuah elektron melompat ke orbit d ke orbit d yang lain. Pada senyawa logam transisi yang kompleks lantan orbital d tidak memp. tingkat energi yang sama akibat splitting oleh medan ligan. Pola pemisahan orbital d dapat dihitung oleh teori medan kristal.

2). Macam transisi elektronik, contoh.

1). Transisi d-d

Contoh: $[\text{Tl}(\text{H}_2\text{O})_6]^{3+}$

2) Transisi antara ion logam dengan ligan dalam orbital molekul (Charge transfer).

Contoh: $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}$

3). Pada vibrasi molekul pada kompleks oktahedral berlangsung lebih singkat karena oktahedral memiliki ikatan pada sumbu simetri $3x_2$ bercampuran orbital akibat vibrasi molekul sangat labil dan menghasilkan orbital transisi d-d yang singkat dan spektranya lemah. Sedangkan vibrasi molekul pada kompleks tetrahedral ikatannya tidak memiliki sumbu simetri maka vibrasi molekul bertahan lama dan spektranya kuat.

4). Prediksikan warna senyawa kompleks $\text{Cu}(\text{H}_2\text{O})_6\text{Cl}_2$ yang menyerap sinar pada λ 680 nm dan $\text{Ni}(\text{NH}_3)_6\text{Cl}_2$ yang menyerap sinar pada 570 nm. hitung energi abs? \circ

\circ $\text{Cu}(\text{H}_2\text{O})_6\text{Cl}_2$ = warna hijau

\circ $\text{Ni}(\text{NH}_3)_6\text{Cl}_2$ = warna ungu. ..
energi.

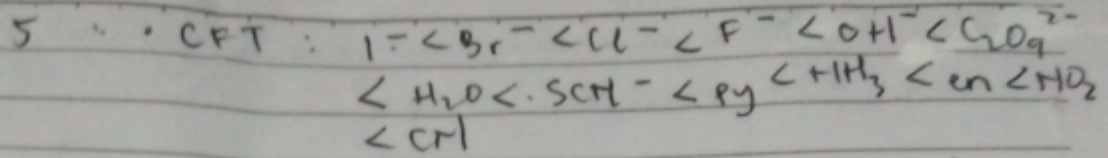
$$\text{Cu}(\text{H}_2\text{O})_6\text{Cl}_2 \quad \lambda \text{ 680 nm} = 680 \cdot 10^{-9} \text{ m}$$

$$\Delta = h\nu = \frac{hc}{\lambda} = \frac{(6.63 \cdot 10^{-34} \text{ Js})(3 \cdot 10^8 \text{ m/s})}{680 \cdot 10^{-9} \text{ m}}$$
$$= 2,925 \cdot 10^{-19} \text{ J}$$
$$= 2,925 \cdot 10^{-17} \text{ J}$$

$$\text{Ni}(\text{NH}_3)_6\text{Cl}_2: \lambda \text{ 570 nm } \quad \text{W}$$

$$\Delta = \frac{(6,63 \cdot 10^{-34} \text{ Js})(3 \cdot 10^8 \text{ m/s})}{570 \cdot 10^{-9} \text{ m}}$$
$$= 0,03489 \cdot 10^{-19} \text{ J}$$
$$= 3,5 \cdot 10^{-17} \text{ J}$$

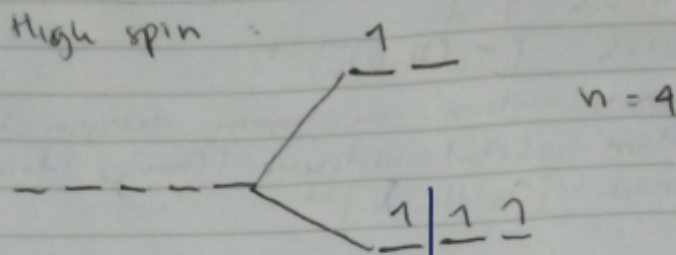
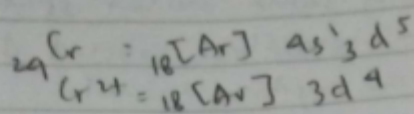
estudee



Deret kekuatan ligan berdasarkan besarnya Δ_o

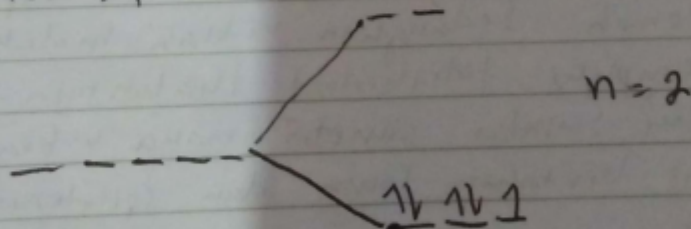
Pada teori MOT Δ_o terjadi penggabungan orbital molekul dengan perbedaan tingkat energi pemisahan orbital (splitting) (Teori LFT).

6) . Harga low spin dan high spin
 $[Cr(en)_3]Br_2$



$$\begin{aligned} \mu_s &= \sqrt{n(n+2)} \\ &= \sqrt{4(4+2)} \\ &= \sqrt{24} \\ \mu &= 4,898 \text{ BM} \end{aligned}$$

low spin :




$$\begin{aligned} \mu &= \sqrt{n(n+2)} = \sqrt{2(2+2)} = \sqrt{8} \\ &= 2,82 \text{ BM} \end{aligned}$$

D.3. RECAPITULATION OF ASSESSMENT

D.3.1. Validate Test Item

The end-of-semester evaluation questions consist of eight items in the form of essay questions analyzed content through experts in the appropriate field of Chemistry analyzed. Essay questions are validated with expert judgment in the course team members. The analysis was conducted by taking into account several aspects, namely the suitability of the questions with the course outcome, language, content and construct.

D.3.2 Evaluation Results of Coordination Chemistry

PROGRAM STUDI S1 Kimia											Original data :
DAFTAR NILAI MAHASISWA											
Mata Kuliah : Kimia Anorganik II: Koordinasi											
Kelas : 2018A											
Tahun Ajaran : 2019/2020 Genap											
Keterangan :											
1. Komponen nilai yang diisi hanya : Part,Tugas,UTS dan UAS											
2. Nilai UAS mahasiswa dengan kehadiran dibawah 73.3% (kolom dg warna merah) tidak akan disimpan											
3. Jangan merubah apapun di dokumen ini kecuali pada point nomer satu di atas.											
4. PPTI / BAAK tidak menerima file nilai untuk diupload. Proses upload nilai dilakukan oleh dosen pengampu yang bersangkutan.											
No	NIM	Nama Mahasiswa	Angkatan	Kehadiran	Part	Tugas	UTS	UAS	NA	Huruf	Pakai
1	18030234001	KURROTU AINI	2018	100%	75	79	78	77	77.25	B+	1
2	18030234002	LAILA AYUNI HIDAYAH	2018	100%	78	81	84	71	78	B+	1
3	18030234004	FARIDA DWI OKTAVIA	2018	100%	75	83	79	74	77.6	B+	1
4	18030234005	AWANDA HALIDA RAMADANTI	2018	100%	78	83	83	80	80.85	A-	1
5	18030234006	NITA SUTANTO	2018	100%	78	76	83	78	78.15	B+	1
6	18030234007	NANDA REVITA DWI LESTARI	2018	100%	82	81	83	73	78.95	B+	1
7	18030234008	RIFANDA VIANIANO HARSONO	2018	100%	78	82	74	78	78.25	B+	1
8	18030234009	YOSSY NUR ANNISA	2018	100%	78	82	78	81	80	A-	1
9	18030234019	RISKA AMELIA LAWARTI	2018	93.33%	82	85	83	83	83.3	A-	1
10	18030234022	AMANATUR ROVIQOH	2018	100%	78	80	78	72	76.55	B+	1
11	18030234023	ELSA RISHDA HARININGTIAS	2018	100%	75	82	78	76	78	B+	1
12	18030234024	FASTABIQUL KHAIRATI RHAMDIYAH	2018	100%	78	84	79	73	78.35	B+	1
13	18030234025	ACHMAD FITRIADI AKBAR	2018	100%	80	83	78	78	79.9	B+	1
14	18030234026	ARMY DEWI CAHYANTI	2018	100%	78	80	77	76	77.55	B+	1
15	18030234027	INTAN FATMA LISTIANDARI	2018	93.33%	75	79	78	72	75.75	B+	1
16	18030234028	FAIZAH RYANITA PUTRI	2018	100%	80	84	79	76	79.65	B+	1
17	18030234029	GORA FAHMAN	2018	100%	75	83	73	76	77.05	B+	1
18	18030234030	HIDAYATUL MAULIDA FATIKHUROKHMMAH	2018	100%	78	84	78	78	79.7	B+	1
19	18030234031	ARDHIA PRAMESTI RIGITA	2018	100%	82	75	78	79	78.1	B+	1
20	18030234032	DHEA RAHMADANY PRASASTI	2018	100%	78	83	78	76	78.9	B+	1
21	18030234033	HENDRIK HARISMAN	2018	80%	75	79	78	75	76.8	B+	1
22	18030234041	FIKALIAH KUSNANDAR RIRIN ULI RIWU	2018	100%	80	82	79	72	77.7	B+	1
23	18030234046	GIA RAHAYU NINGSIH	2018	100%	78	80	87	73	78.8	B+	1
24	18030234048	SEVILA DESTY ANGGRIANI	2018	100%	75	85	82	76	79.3	B+	1
25	18030234052	DEDY ABURIZAL KHUSWANTO	2018	100%	78	84	77	74	78.3	B+	1
26	18030234053	SHETYA ATRİYANI ERSYADA	2018	100%	78	83	78	78	79.5	B+	1
27	18030234054	ADELLA MEUTIA GHASSANI	2018	100%	78	83	73	71	76.15	B+	1
28	18030234055	ANNISA FAUZIAH ZAIN	2018	100%	75	78	77	76	76.5	B+	1
29	18030234056	RISKA NUR SAFITRI	2018	100%	75	84	79	72	77.6	B+	1
30	18030234057	SITI NUR MUFIDA	2018	100%	78	80	84	80	80.25	A-	1
31	18030234058	TIARA RAHMAWATI	2018	100%	78	83	78	75	78.5	B+	1
32	18030234059	TRI DYAH ANDIANITA	2018	100%	75	83	75	76	77.55	B+	1
33	18030234060	ALFITA DHURROTUL LU'MA	2018	100%	78	80	73	75	76.6	B+	1
34	18030234070	KHOLILUR ROCHMAN	2018	93.33%	75	79	78	78	77.7	B+	1

PROGRAM STUDI S1 Kimia
 DAFTAR NILAI MAHASISWA
 Mata Kuliah : Kimia Anorganik II: Koordinasi
 Kelas : 2018B
 Tahun Ajaran : 2019/2020 Genap

Original data :



Keterangan :

1. Komponen nilai yang diisi hanya : Part,Tugas,UTS dan UAS
2. Nilai UAS mahasiswa dengan kehadiran dibawah 73.3% (kolom dg warna merah) tidak akan disimpan
3. Jangan merubah apapun di dokumen ini kecuali pada point nomer satu di atas.
4. PPTI / BAAK tidak menerima file nilai untuk diupload. Proses upload nilai dilakukan oleh dosen pengampu yang bersangkutan.

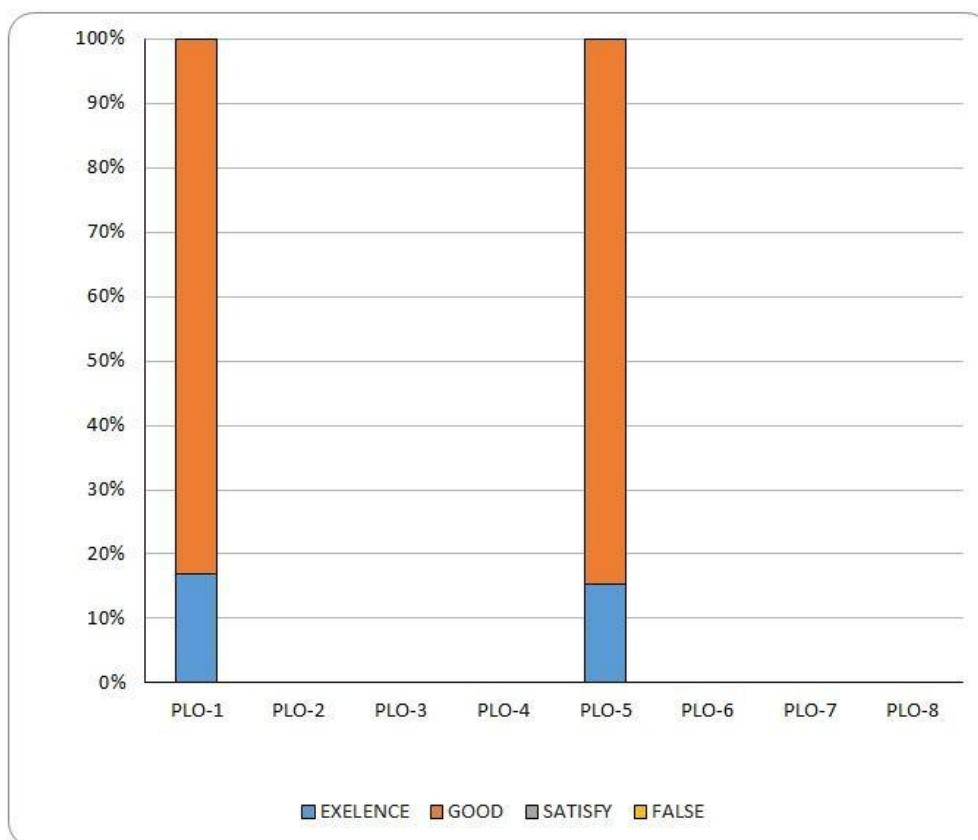
No	NIM	Nama Mahasiswa	Angkatan	Kehadiran	Part	Tugas	UTS	UAS	NA	Huruf	Pakai
1	18030234010	LUTFIAH BERLIANTI	2018	100%	82	84	78	78	80.6	A-	1
2	18030234011	NABELLA DWITARANI	2018	100%	82	83	72	78	78.85	B+	1
3	18030234012	HILYATUL MALIKHAH	2018	93.33%	78	83	82	71	78.1	B+	1
4	18030234014	ALVIRA RAHMADANI PUTRI	2018	93.33%	75	82	73	74	76.15	B+	1
5	18030234015	DIANA KHOLIDA	2018	100%	78	84	78	78	79.8	B+	1
6	18030234016	YAYUK PUJI LESTARI	2018	100%	78	85	82	78	80.65	A-	1
7	18030234017	ANISA KURNIA SARI	2018	100%	78	82	78	76	78.45	B+	1
8	18030234018	TAHTA ALFI NAHDIYAH	2018	100%	80	83	80	78	80.15	A-	1
9	18030234020	NUR LALILYAH	2018	100%	83	84	80	78	81.05	A-	1
10	18030234034	NABILA ESTIANI ALSARI	2018	100%	83	84	79	82	82.2	A-	1
11	18030234035	INDAH TRI WAHYUNI	2018	100%	75	84	78	73	77.45	B+	1
12	18030234036	MAREIDHA NANDA DEWI	2018	100%	78	80	74	75	76.9	B+	1
13	18030234037	TITIK MARDIYANTI SOFYAH	2018	100%	78	82	77	77	78.45	B+	1
14	18030234038	HESTI SRI PREHATINI	2018	100%	80	83	79	78	80.1	A-	1
15	18030234039	RIZKY ABDUR RAHMAN	2018	100%	78	83	72	75	77.3	B+	1
16	18030234040	IVAN NANDASYAH	2018	93.33%	78	82	77	75	77.85	B+	1
17	18030234042	MOHAMMAD FAKHRUL MUFID	2018	100%	75	81	82	75	78.1	B+	1
18	18030234044	QONITA ARKY HAFIDHA	2018	100%	82	84	78	78	80.35	A-	1
19	18030234045	PUTRI AZIZAH KURNIA FATAH	2018	100%	75	80	79	78	78.2	B+	1
20	18030234049	FILZA QURROTA AINI	2018	100%	78	85	79	75	79.25	B+	1
21	18030234050	RAFIQI RAJAUDDIN AMIN	2018	100%	78	81	80	78	79.3	B+	1
22	18030234051	ERCA HARIYANA	2018	100%	75	81	79	76	77.9	B+	1
23	18030234061	NAVIRRA AYU KHUDZAIFAH	2018	100%	78	82	85	78	80.45	A-	1
24	18030234062	DINDA KOESWANTIKA PUTRI	2018	100%	82	84	78	74	79.25	B+	1
25	18030234063	ERVINA RETNANINGTYAS INDARWATI	2018	100%	82	83	78	71	78.05	B+	1
26	18030234064	NUR ISLAHAH	2018	100%	82	82	74	78	79.05	B+	1
27	18030234065	KAYLA NAULIA FADHILA	2018	100%	82	81	78	80	80.05	A-	1
28	18030234066	RIZKA BELLA ANDRIANI	2018	100%	78	84	78	76	79.05	B+	1
29	18030234067	NABILA ALMIRA	2018	100%	78	82	82	78	79.75	B+	1
30	18030234068	ADITYA ARIF BUDIMAN	2018	93.33%	75	80	83	80	79.5	B+	1
31	18030234069	TRISNA NUR JA'FAR	2018	100%	75	80	84	72	77.4	B+	1

D.3.3 Percentage of PLO achievements of Coordination Chemistry at Academic Year 2019/2020

PLO ASSESSMENT

Lecture : Coordination Chemistry
Code : 4720102064
Department : Chemistry Department
Total of Student : 65

	PLO-1	PLO-2	PLO-3	PLO-4	PLO-5	PLO-6	PLO-7	PLO-8
EXELENCE	17%				15%			
GOOD	83%				85%			
SATISFY	0%				0%			
FAIL	0%				0%			
	100%	0%	0%	0%	100%	0%	0%	0%



created by: Sukarmin