

BITS, PILANI - DUBAI
I YEAR FIRST SEMESTER, 2011-2012 (REPEATERS)
COMPREHENSIVE EXAMINATION (Closed book)

Course Title: Chemistry-II

Course No: CHEM C142

Date: 09.01.2012

Total Marks: 40

Time: 3 hours

Weightage: 40%

- Note:**
1. Answer Part A and B separately.
 2. Answer briefly all parts sequentially
 3. Useful atomic numbers: C(6), Cl(17), Br(35), I (53), Cr(24), Mn(25), Co(27), Fe(26), Ni(28), Cu(29), Zn(30)
 4. Question paper contains 2 pages

PART-A

1. (i) Show the d-orbital splitting (with electronic arrangements) of Cu^{2+} in square planar complexes.

(ii) Calculate the CFSE in terms of Δ_o for a d^6 system in weak field octahedral and tetrahedral complexes. Which is more stable? Why?

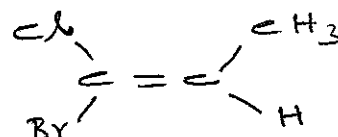
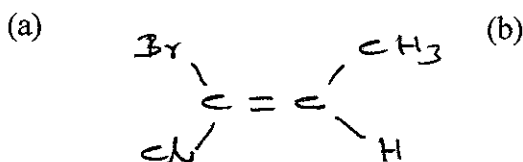
(iii) Explain JAHN-TELLER distortion with respect to a d^4 arrangement. [2+3+5 M]
2. (i) Write the formula of Diaquatetrachloro Zincate(II)

(ii) For the following complexes, identify their structure and account for it using VBT.
(a) $[\text{CoCl}_2(\text{H}_2\text{O})_4]$ (b) $[\text{Ni}(\text{CN})_4]^{2-}$ [2+2+2 M]

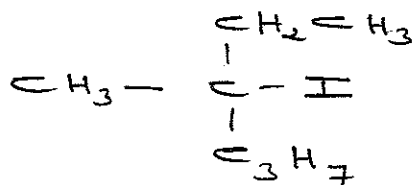
(iii) Draw the structure and mention each type of bonds in pentaborane -9. Balance the total number of electrons. [4 M]

PART-B

1. (i) Name the following compounds using E- Z- nomenclature



- (ii) Why substituents on chair conformers prefer to occupy equatorial positions?
- (iii) Discuss the mechanism for the racemisation of the following compound with methanol in the S_N1 reaction.



[4+3+3 M]

2. (i) For the following reaction, predict the mechanism followed and give the major and minor products formed.



- (ii) Draw the structure and assign the R (or) S configuration for the following compounds. Also indicate the priority order of the groups.

- (a) Natural alanine. (b) Unnatural alanine.

- (iii) Explain the chlorination of methane by free-radical chain reaction mechanism. [3+3+4 M]

BITS, PILANI – DUBAI CAMPUS,
DUBAI INTERNATIONAL ACADEMIC CITY
FIRST YEAR (REPEATERS) – SECOND SEMESTER (2011-'12)

TEST-2 (Open Book)

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|------------------------------------|-----------------------------|
| Course Title : CHEMISTRY II | Course No: CHEM C142 |
| Date : 12.12.2011 | Maximum Marks : 20 |
| Time : 50 min | Weightage : 20% |

1. Draw the structure of Decaborane. Enlist all the types and number of bonds.
Balance the total valance electrons. [2+4+4 = 10 M]
 2. Write the most stable and the least stable conformers of 2,3-dimethyl butane by using Newmann projection. Justify your answer. [5M]
 3. Explain the mechanism for the conversion of 1-butene to 2-butanol by Oxymercuration- Demercuration process. [5M]
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BITS, PILANI DUBAI CAMPUS, DUBAI INTERNATIONAL ACADEMIC CITY

FIRST SEMESTER 2011- 12 (REPEATERS)

TEST- 1 (Closed book)

Course Title: Chemistry- II

Course No: CHEM C 142

Date: 17.10.2011

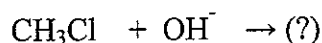
Total Marks: 25

Time: 50 min

Weightage: 25 %

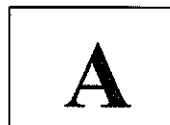
Answer all Questions

1. Discuss the oxidation state, hybridization and magnetic property of $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$ with the help of VB theory. (4 M)
2. Give the formula of Tetracyano nickelate(II) and Sodiumtetrachloro zincate(II)(4 M)
3. Write the IUPAC name of $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$ and $[\text{Cr}(\text{H}_2\text{O})_6][\text{CrCl}_6]$ (4 M)
4. For the given nucleophilic substitution reaction



- a) Write the rate expression and kinetics.
 - b) Effect of doubling OH^- concentration.
 - c) Mechanism of the reaction. (4M)
5. Draw the enantiomers of 1,1-chlorobromoethane and assign the R and S configuration. (4M)
 6. Explain the trends in nucleophilicity for the strength of nucleophiles for $\text{S}_\text{N}2$ reactions. (3M)
 7. Write the IUPAC name of the following compounds.
 - a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CONH}_2$
 - b) $\text{CH}_3\text{CH}(\text{OH})\text{COOH}$ (2M)

NB : Atomic number of Cr : 24



BITS, PILANI – DUBAI CAMPUS
FIRST SEMESTER 2011– 2012

Course Code: CHEM C142 **FIRST YEAR (Repeaters) Quiz-2**
Course Title: Chemistry II
Duration: 20 minutes

Date: 28.11.2011
Max Marks: 7
Weightage: 7 %

Name: ID No: Sec / Prog:

Instructions: (if any) Over writing will be taken as wrong answer
Question paper has 2 pages.

1. Comment on the metallic property when moving from boron to thallium (1 M)

2. What is inert pair effect and account the reason. (1 M)

3. Which one of the following is having more ionic radius Ga^{3+} or Al^{3+} ? (1 M)

4. The melting point of gallium is very low. Why? (1 M)

5. Mention the possible stereo-isomers in 2,3-dichloro hexane. (1M)
6. How will you prepare acetaldehyde by addition reaction? (1M)
7. Write the IUPAC notation used to distinguish enantiomers. (1M)

Rough work

BITS, PILANI – DUBAI
FIRST SEMESTER 2010 – 2011
FIRST YEAR (Repeaters) Quiz-1

Course Code: CHEM C142
Course Title: Chemistry II
Duration : 20 minutes

Date: 31.10.2011
Max Marks: 8
Weightage: 8 %

Name: ID No: Sec / Prog:

Instructions: (if any) Over writing will be taken as wrong answer.

Question paper has 2 pages.

At. No: Zn: 30

1. Calculate the CFSE for a high-spin octahedral complex of a d^7 ion. (1M)
2. Calculate the tetrahedral CFSE of $[\text{ZnCl}_4]^{2-}$ by showing the arrangement of electrons in its e_g and t_{2g} orbitals. (1M)
3. Explain Jahn – Teller Distortion. (2M)
4. What is dehydrohalogenation? Give one example. (1M)

5. How t-butylbromide is converted into 2-methylpropene? (1M)
6. Write the observed product in the addition of HBr to 2-methyl-2-butene. (1M)
7. Which can act as a strong nucleophile: Methoxide ion or acetate ion? (1M)