B.A. / B.Sc. SEMESTER 4 EXAMINATION, 2020
FAKIR CHAND COLLEGE CENTRE (551)

INSTRUCTIONS FOR CANDIDATES

READ ALL THE INSTRUCTIONS CAREFULLY BEFORE WRITING ANSWERS

1. Total **TIME OF EXAMINATION: 2 HOURS**
2. **Question Paper Comprises Of Three Separate Questions – Theoretical (25 Marks), Practical (15 Marks) And Internal Examination (10 Marks). Candidates Must Have To Answer All The Three Separately And Finally Have To Prepare A Single pdf File By Scanning All The Papers Clearly And Serially (According To Page Numbers).**
3. **ATTACH ANYONE PREVIOUS SEMESTER ADMIT CARD** As The Last Page Of The pdf File
4. Use Only **WHITE PLAIN A4 PAPERS** For Writing Answers
5. Use **ONLY BLACK INK** For Writing Your Answers
6. Give **A TOP PAGE** With Clear Mention Of University **REGISTRATION NO. AND UNIVERSITY ROLL NO.** Of Anyone Previous Semester
7. **GIVE PAGE NO.** At The Top Right/Middle Of Each Page
8. Give **AT LEAST 1CM MARGINS** In All The Four Sides Of Each Page

2020
B.A. /B.Sc. Semester 4 Examination
University of Calcutta
CHEMISTRY – HONOURS
THEORETICAL
Paper : CC10
F.M. 25

FAKIR CHAND COLLEGE CENTRE(551)

Q.1 Answer ANY FOUR questions. 1X4

a) What do you mean by Crystal field stabilization energy?

b) What is lanthanide contraction?

c) Why is $KMnO_4$ intensely purple coloured? Explain.

d) The lanthanide elements show the common stable oxidation state of +3. Comment.

e) What are Racah parameters?

g) What is trans effect?

Answer ANY THREE from Question Nos. 2-6 questions.

Q.2 a) Construct the Orgel diagram for a high spin $[CoL_6]^{2+}$ complex and mention the probable transitions. 4

b) $[PtCl_4]^{2-}$ is square planar whereas $[NiCl_4]^{2-}$ is tetrahedral. Comment. 3

Q.3 a) Explain briefly the principle of separation of lanthanides by ion exchange method. 4

b) Atomic radii of Nb and Ta are almost identical. Explain. 3

Q.4 a) How can you prepare cis- and trans- isomers of $[Pt(C_2H_4)Cl_2(NH_3)]$ from $K_2[PtCl_4]$ by using trans effect ? 4

b) What do you mean by thermodynamic stability and kinetic stability of a complex? 3

Q.5 a) Compare Cu, Ag and Au with respect to stability of their oxidation states. 4

b) Usually colourful complexes are observed in actinide series while most of the lanthanide complexes are colourless. Justify. 3

Q.6 a) "On addition of Conc. HCl to an aqueous solution of Cobalt (II), a deep colour results" - Explain the observation in light of electronic spectra. 4

b) Position of CO in the spectrochemical series is higher than CN^- . Explain. 3

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University of Calcutta
CHEMISTRY – HONOURS
PRACTICAL
Paper : CC10
F.M. 15

FAKIR CHAND COLLEGE CENTRE(551)

Answer ANY FOUR questions.

Q.1 Write the reaction involved in the preparation of Potassium diaquadioxalato chromate (III) dihydrate, $K[Cr(C_2O_4)_2.(H_2O)_2].2H_2O$ 3

Q.2 What is the colour of the complex $[Co(NH_3)_4CO_3]NO_3.0.5\ H_2O$? Name the reagents used in the preparation of $[Co(NH_3)_4CO_3]NO_3.0.5H_2O$. 3

Q.3 Write the reactions involved in the preparation of $Fe(acac)_3$. 3

Q.4 Write the reaction involved in the preparation of $[Co(NH_3)_4CO_3]NO_3.0.5H_2O$. 3

Q.5 Write the reaction involved in the preparation of $[Ni(en)_3]Cl_2.H_2O$. 3

Q.6 What is the colour of the complex $Fe(acac)_3$? Name the reagents used in the preparation of $Fe(acac)_3$. 3

Laboratory Proficiency / Laboratory Notebook 3

2020
B.A. /B.Sc. Semester 4 Examination
University of Calcutta
CHEMISTRY – HONOURS
INTERNAL EXAMINATION
Paper : CC10
F.M. 10

FAKIR CHAND COLLEGE CENTRE(551)

Q.1) La^{3+} is

a) diamagnetic b) paramagnetic c) antiferromagnetic

Q.2) The most common oxidation state of Copper is

a) +1 b) +2 c) +3

Q.3) stepwise stability constants for Zn(II)-en complexes follow the order (en = ethylene diamine)

a) $K_1 > K_2 >> K_3$ b) $K_1 > K_3 > K_2$ c) $K_3 >> K_1 > K_2$

Q.4) In separation of lanthanides by ion -exchange method , the eluting agent acts as a

a) dehydrating agent b) a buffering agent c) a complexing agent

Q.5) The magnitude of Crystal field splitting in an octahedral field depends on

a) nature of ligands b) nature of metal ions c) charge on ligands

Q.6) Iodide (I^-) is

a) an ambidentate ligand b) a strong field ligand c) a weak field ligand

Q.7) 10 Dq increases in the order

a) $[CrCl_6]^{3-} < [Cr(NH_3)_6]^{3+} < [Cr(CN)_6]^{3-}$

b) $[Cr(CN)_6]^{3-} < [CrCl_6]^{3-} < [Cr(NH_3)_6]^{3+}$

c) $[Cr(NH_3)_6]^{3+} < [Cr(CN)_6]^{3-} < [CrCl_6]^{3-}$

Q.8) Ni(II), Cu(II), Pd(II), Pt(II) commonly form

a) octahedral complexes

b) tetrahedral complexes

c) square planar complexes

Q.9) The value of spin only moment for a complex with two unpaired electrons is

a) 2.83 B.M. b) 5.86 B.M. c) 2.56 B.M.

Q.10) How many unpaired electrons are there in a strong field Fe(II) octahedral complex

a) 0 b) 2 c) 4