

GANPAT UNIVERSITY

M.Sc. First Semester Examination (C.B.C.S.) Nov-Dec, 2013

Subject : CHEMISTRY

CHA 101 ICH Inorganic Chemistry

[Total Marks: 70

Time: 3 hours]

**Instructions:**

1. Attempt any three questions from each section, of which question No. 4 and 8 are compulsory.
2. Answer each section in separate answer book

**SECTION: I**

- Q-1 (a) Prove that the stability for  $H_2^+$  ion is high in symmetrical wave function (Es). 7
- (b) Prove that  $[Co(NH_3)_6]^{+3}$  is diamagnetic and  $[CoF_6]^{-3}$  is paramagnetic by the use of M.O. Treatment of octahedral complex. 7
- Q-2 (a) Explain the uncertainty principle. 7
- (b) By the use of Schrodinger equation prove that  $H\Psi = E\Psi$ . 7
- Q-3 (a) Write a short note on condition of Normalization of wave functions.. 7
- (b) Describe Eigen values and Eigen functions. 7
- Q-4 Attempt all: 7
- (a) Write Pauli's exclusion principle.
- (b) Write secular equation.
- (c) Write the wave function for  $SP^3$  hybrid orbital.
- (d) Write the Schrodinger equation for three dimension particle.
- (e) Explain the physical importance of  $H_{11}$  and  $S_{12}$ .
- (f) Explain the definition of the operator  $\nabla$ .
- (g) Give the name of various series of spectral line in the spectrum of H atom.

**SECTION: II**

- Q-5 (a) Explain the importance of Ring structure (Chelation) in stability in complex ion. 7  
(b) Explain Job's method. 7
- Q-6 (a) Explain all the rules of multiplication are followed for  $C_{2h}$  point group. 7  
(b) Explain the Great orthogonality theorem for Irreducible representation. 7
- Q-7 (a) Find out  $\overline{\Gamma_{3N}}$  (gamma 3N) following:  $H_2O$ ,  $NH_3$ ,  $N_2H_4$ ,  $CiS$  and Trans. 7  
(b) Vibration spectra of  $SO_2$  molecule are under: 7
- | IR                                  | Raman            |
|-------------------------------------|------------------|
| $518\text{ cm}^{-1}$ (wave numbers) | 524 (Polar)      |
| $1151\text{ cm}^{-1}$               | 1145 (Polar)     |
| $1362\text{ cm}^{-1}$               | 1136 (non polar) |
- Assignment all frequency. 7
- Q-8 Attempt all: 7
- (a) Give the definition of  $A_1$  and  $B_1$  by the use of character table.
- (b) Find out the point group and symmetric element by figure of  $C_3H_4$  atom.
- (c) Give an example of  $C_s$  and  $C_1$  point group with symmetry element.
- (d) Write down matrix for  $C_{2v}$  point group.
- (e) Explain in short: Inverse Matrix with example .
- (f) Explain in short: Kinetic stability.
- (g) Draw the structure of E.D.T.A.

-----END OF PAPER-----

**GANPAT UNIVERSITY**  
**M.Sc. Chemistry First Semester Examination (C.B.C.S) Nov-Dec, 2013**  
**CHA 102 OCH, Organic Chemistry**

**Time: 3 hours**

**Total Marks: 70**

**Instructions:**

- 1) Attempt any three questions from each section, of which question No. 4 and 8 are compulsory
  - 2) Answer each section in separate answer book.
- 

**SECTION: I**

- Q-1 A. Define aromaticity and explain the criteria of aromaticity by neutral and charged aromatic systems. 07
- B. Write the factors influencing the mechanism of aliphatic nucleophilic substitution reactions. 07
- Q-2 A. Give the E1 and E2 mechanism with example. 07
- B. Write note on functional group analysis of carboxylic acid derivatives by various methods. 07
- Q-3 A. Explain the types of stereoisomerism. 07
- B. Write note on cyclosteroisomerism in brief. 07
- Q-4 Give one word answer for following questions. 07
- a. Give the type of SN reactions for ethyl bromide
  - b. Give the type of SN reactions tert. butyl bromide.
  - c. Which ring is present in Cytosine?
  - d. \_\_\_\_\_ of organic compound is detected by bromination method?
  - e. Diazotization is the technique to analyse the \_\_\_\_\_ functional group.
  - f. SET mechanism is used in \_\_\_\_\_ reaction.
  - g. Isomer having non superimposable mirror images are \_\_\_\_\_.

## SECTION: II

- Q-5 A. Give Hansch-Widman rule for the nomenclature of heterocyclic compounds 07  
B. Write the synthesis of aziridines and oxiranes. 07
- Q-6 A. Explain the basicity of imidazole, pyrrole and pyrimidine. 07  
B. Explain the orientation of nucleophilic substitution in pyridine. 07
- Q-7 A. Write brief note on pyrimidine. 07  
B. Explain Ingold classification of esterhydrolysis with example. 07
- Q-8 Give one word answer for following questions. 07
- Shifting between keton and hydroxyl functional group is called as.
  - Is piperidine more basic than pyridine?
  - Term for change of group between ester and alcohol using catalyst.
  - Term used for property by which some molecule can be converted into stereoisomers.
  - Removal of carboxylic acid group from the organic reaction is called.
  - Is imidazole present in histamine?
  - Draw the structure for 5-amino-4- bromoisoxazole.

END OF QUESTION PAPER

GANPAT UNIVERSITY  
M.Sc. First Semester Examination (C.B.C.S) Nov-Dec, 2013  
CHA 103 PCH-Physical Chemistry

Time: 3 hours

Total Marks: 70

Instructions:

- 1) Attempt any three questions from each section, of which question No. 4 and 8 are compulsory
  - 2) Answer each section in separate answer book.
- 

SECTION: I

- Q-1 a. Derive Nernst heat theorem and compare with respect to thermodynamics third law. 7  
b. Discuss different types, factor affecting and measurement of adsorption. 7
- Q-2 a. What is chemical potential, explain how it can be calculated. 7  
b. Enlist method for determination of activity and activity coefficient and discuss vapour pressure method. 7
- Q-3 a. Discuss B. E. T. adsorption isotherm. 7  
b. At  $500^{\circ}\text{C}$  E.M.F. of the cell  $\text{Ag(s)}/\text{AgBr}(\text{N}_1)$  is fused  $\text{LiBr}/\text{Br}_2(\text{g})$  is 0.7865 volt when the electrolyte is pure AgBr; the E.M.F. is 0.8085 volt, when the mole fraction ( $\text{N}_1$ ) is 0.5937. Calculate the activity coefficient in the latter case, the standard state being taken as pure liquid AgBr. 7
- Q-4 a. Give name of Instrument used for measurement of adsorption. 7  
b. Entropies calculated by third law of thermodynamics is called ?  
c. Define activity.  
d. Which parameter kept constant in adsorption isobar plot ?  
e. Give unit of entropy.  
f. Which types of adsorption is multilayer adsorption ?  
g. Define isopiestic solution.

SECTION: II

- Q-5 a. Classify and discuss types of thermotropic liquid crystals. 7  
b. Derive rate equation and give characteristics of second order reaction. 7
- Q-6 a. Discuss Polymorphism in thermotropic liquid crystals 7  
b. Calculate the activation energy of a reaction whose rate constant is  $10^{11} \text{ s}^{-1}$  at 27°C. 7  
In the temperature in the vicinity of 27°C.
- Q-7 a. A first order reaction is 15 % complete in 20 minutes. How long will it take to be 7  
complete 50, 75 and 100 %.
- b. Discuss Lindemann theory and its limitations of unimolecular gaseous reaction. 7
- Q-8 a. Define anisotropy. 7  
b. Give basic concept of Arrhenius theory for chemical kinetic.  
c. Explain thermograph.  
d. Define complex reaction.  
e. Explain reaction velocity.  
f. Define photochemical reaction.  
g. Explain molecularity.

-----END OF PAPER-----

**GANPAT UNIVERSITY**  
M.Sc. First Semester Examination (C.B.C.S) Nov-Dec, 2013  
Subject: Chemistry (Organic /Analytical)  
Paper: **CHA 104 BMA - Basic Instrumental Methods of Analysis**

Time: 3 hours

Total Marks: 70

**Instructions:**

- 1) Attempt any three questions from each section, of which question No. 4 and 8 are compulsory
- 2) Answer each section in separate answer book.

---

**SECTION: I**

- |     |  |    |
|-----|--|----|
| Q-1 | Differentiate indicator & reference electrodes. Give detail account on indicator electrodes used in Potentiometry. | 14 |
| Q-2 | Discuss types of conductometric titrations. Give applications of conductometry.                                    | 14 |
| Q-3 | a. Write account on Potentiometric titrations  | 07 |
|     | b. Discuss construction & working of Electro Chemical Cell   | 07 |
| Q-4 | Answer the followings  | 07 |
|     | a. How platinization of the electrodes can be done?  |    |
|     | b. What is specific conductance? Write unit.   |    |
|     | c. Give limitations of instrumental methods of analysis.   |    |
|     | d. Explain liquid junction potential.  |    |
|     | e. Which electrodes are used in acid-base titration?   |    |
|     | f. Differentiate electrolytic cell & voltaic cell.   |    |
|     | g. Write redox reaction occur in saturated calomel electrode.  |    |

**SECTION: II**

- |     |  |    |
|-----|--|----|
| Q-5 | Explain theories of chromatography. Write a note on paper chromatography.        | 14 |
| Q-6 | Write a note on DME. Explain modifications in polarography.                      | 14 |
| Q-7 | a. Write brief account on practical considerations of thin layer chromatography. | 07 |
|     | b. Justify: Multiple extraction is better than single extraction                 | 07 |
| Q-8 | Answer the followings  | 07 |
|     | a. Define $R_f$ value.   |    |
|     | b. Why activation of TLC plate is necessary?                                     |    |
|     | c. Why supporting electrolytes are necessary in Polarographic analysis?          |    |
|     | d. Why dissolved oxygen is removed from sample before Polarographic analysis?    |    |
|     | e. What is residual current?   |    |
|     | f. What is edge effect in TLC?   |    |
|     | g. Define Retention Time.  |    |

-----END OF PAPER-----

**GANPAT UNIVERSITY**  
**M.Sc. Chemistry (Organic and Analytical) Sem-I CBCS Regular Examination**  
**Nov-Dec 2013**  
**CHB 105 LCS: Language and Communication Skills**

**Time: 3 Hours**

**Total Marks: 70**

**Instructions:**

- (1) Attempt any three questions from each section, of which question No. 4 and 8 are compulsory
- (2) Answer each section in separate answer book.

**SECTION – I**

**Q:1 Answer the following questions:**

- (a) What is Communication? Explain the stages of Communication. (07)
- (b) Describe 7 C's for effective communication. (07)

**Q:2 Answer the following questions:**

- (a) Discuss Physical barrier in communication. (07)
- (b) What is Oral communication? Discuss advantages and disadvantages of Oral communication. (07)

**Q:3 Answer the following questions:**

- (a) Discuss Written communication with advantages and disadvantages. (07)
- (b) Explain Nonverbal communication. (07)

**Q:4 Do as directed. (07)**

- (a) the tajmahal was built by shahjaha (punctuate this sentence )
- (b) Students can \_\_\_\_\_ any topic for presentation. (choose/chose)
- (c) We took the proper decide in the game. (correct underline part)
- (d) Sadness is worst feeling. (find out adjective)
- (e) James were playing cricket from the ground. (correct the sentence)
- (f) Do you \_\_\_\_\_ payment by credit card? (accept/except)
- (g) Transform the word 'modify' into noun.



## SECTION – II

**Q:5 Answer the following questions:**

- (a) Introduce Reading. Explain Reading rates. (07)
- (b) Explain Intensive and Extensive reading. (07)

**Q:6 Answer the following questions:**

- (a) Explain Leadership Skills in Group Discussion. (07)
- (b) Discuss various techniques for good Reading comprehension (07)

**Q:7 Answer the following questions:**

- (a) Explain SQ3R reading technique. (07)
- (b) What are the different purposes for reading? (07)

**Q:8 Do as directed. (07)**

- (a) Give the synonym for DENSE.
- (b) Give the meaning of idiom 'Born with silver spoon' with example
- (c) Provide one word for 'A short but amusing story'.
- (d) Rani Laxmibai was not BRAVE. (use the antonym for underline part)
- (e) Provide one word for 'Award given after death'
- (f) Transform the word 'happy' into adverb.
- (g) What is the antonym for PEACEFUL?

-----END OF PAPER-----