(b) Give one reaction in which dihydrogen acts :

(i) as an oxidising agent

(ii) as a reducing agent. **3**

(c) What are metallic and molecular hydrides ? Explain with examples. **4**

(d) Discuss the trends of stability of oxides, carbonates and sulphates of Group II elements. **6**

5. (a) Compare the alkali metals and alkaline eath metals with respect to :

(i) Basicity of oxides

(ii) Solubility of hydroxides. **6**

(b) Why $Be(OH)_2$ dissolves in NaOH but $Mg(OH)_2$ does not ? **3**

(c) Explain any one method for the industrial production of hydrogen. **3**

(d) What is the importance of heavy water with regard to nuclear power generation ? **3**

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B521

Dual Degree B.Sc.(Hons.)/M.Sc.

EXAMINATION, May 2019

(Second Semester)

(Main & Re-appear)

CHEMISTRY

DCH102

Inroganic Chemistry-II

Time : 3 *Hours*] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, Q. No. **1** is compulsory. Attempt *four* more questions from the remaining selecting at least *one* question from each Unit. All questions carry equal marks.

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1. (a) The *cis* isomer of 1, 2-dichloroethene has a dipole moment whereas the *trans* isomer does not. Why ? **2**

(b) What do you understand by ortho and para-Hydrogen ? Explain. **3**

(c) Why do metals usually not occur in nature as nitrates ? **2**

(d) Out of C and CO, which is a better reducing agent for ZnO and why ? **3**

(e) Acid rain is defined as any precipitation with pH < 5.6. Explain **3**

(f) Why does common salt get moisture in the rainy season ? **2**

Unit I

2. (a) List the type of defect that occur in the crystalline solids and give one example of each. **6**

(b) What are van der Waals forces ? Discuss them briefly. **5**

(c) In each of the following pairs compounds, which one is more covalent and why ?

(i) $BeCl_2$ and $MgCl_2$

(ii) CuO and CuS. **4**

3. (a) Describe the electron sea model for bonding in the metals. How does this model explain the common properties of metals ? **6**

(b) Explain, why O-hydroxybenzaldehyde is a liquid at room temperature while *p*-hydroxy benzaldehyde is a high melting solid. **5**

(c) Discuss the different types of bonds present in $CuSO_4.5H_2O$. **4**

Unit II

4. (a) When an alkali metal dissolves in liquid ammonia, the solution turns blue. Explain. **2**

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Unit III

6. (a) Explain the following metals refining techniques using suitable example :

(i) Zone refining

(ii) Electrolytic refining. **6**

(b) The choice of a reducing agent in a particular case depends on thermodynamic factor. How far do you agree with this statement ? Support your opinion with *two* examples. **3**

(c) Differentiate between :

(i) Flux and Slag

(ii) Smelting and Roasting. **6**

7. Explain the following :

(a) The extraction of Au by leaching with NaCN involves both oxidation and reduction. **5**

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(b) Zinc instead of copper is used for the recovery of Ag from $[Ag(CN)_2]^-$. **5**

(c) Partial roasting of sulphide ore is done in the metallurgy of copper. **5**

Unit IV

8. (a) Explain the following terms with suitable example of acid-base reactions :

(i) Steric effects

(ii) Solvation effects. **6**

(b) What are acids and bases according to (i) Arrhenius concept (ii) Bronsted-Lowry concept ? In what respects (ii) is superior to (i). **6**

(c) Why is ammonia termed as a base though it does not contain OH-ions ? **3**

9. (a) Calculate the affinities of the following bases for $(CH_3)_3Sn^{2+}$:

NH_3,CH_3NH_2, $(CH_3)_2NH$, $(CH_3)_3N$ **5**

(b) Out of CH_3COO^- and OH^- which is stronger base and why ? **2**

(c) Out of H_3PO_4 or H_3AsO_4, which is stronger acid ? Explain. **2**

(d) Write a short note on HSAB principle. **7**

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