Printed Pages – 8

D-6321

M.Sc. (IInd Semester) Examination, 2020

CHEMISTRY

(Inorganic Chemistry - II)

Time Allowed : Three Hours

Maximum Marks : 70

SECTION - A

Note : Attempt any ten questions. Each question carries one mark. **1×10=10**

Q. 1. (i) A d^1 electron configuration corresponds to which of the following term ?

(a) D^2

(b) D^1

(c) ^2P

(d) ^3P

(ii) How many microstates are possible for a d^2 configuration including both weak and strong field limits ?

(a) 15

(b) 45

(c) 10

(d) 90

(iii) Structure of a carborane with formula $C_2B_4H_8$ is formally derived from :

(a) Closo-borane

(b) Nido-borane

(c) Arachno-borane

(d) Conjuncto-borane

(iv) What is the pH of 0.0001 molar HCl solution ?

(a) 1

(b) 2

(c) 3

(d) 4

(v) Which metal is present in cyanocobalamin ?

(a) Co

(b) Ca

(c) Mg

(d) Cu

(vi) Carboxy peptidase contains :

(a) Zn (II) and hydrolysis CO_2

(b) Mg (II) and hydrolysis CO_2

(c) Zn (II) and hydrolysis peptide bond

(d) Mg (II) and hydrolysis peptide bond

(vii) Which of the following has square planar structure :

(a) $[Ni\ Cl_4]^{2-}$

(b) $[Ni\ (CO)_4]$

(c) $[Ni\ (CN)_4]^{2-}$

(d) None of these

(viii) A strong acid is same as concentrated acid :

(a) False

(b) True

(ix) In chlorophyll _____ metal ion is present :

(a) Na

(b) Ca

(c) Mg

(d) Cu

(x) The number of 3c-2e bonds present in $Al(BH_4)_3$ is _____.

(xi) The reaction between an acid and base is called _____.

(xii) The first talk about nanotechnology was given by _____.

SECTION - B

Note : Attempt any five questions. Each question carries two marks. **5×2=10**

Q. 2. Very short answer type (25-30 words) :

(i) What is spectroscopic ground state ?

(ii) Give the example of carborane and metal carbonyl.

(iii) Write the structure of $Mn_2(CO)_{10}$ metal carbonyl.

(iv) Explain symbiosis with example.

(v) Name two widely distributed oxygen carrier proteins.

(vi) Define EAN rule and give example.

(vii) Write the use of lanthanide compound as shift reagents.

SECTION - C

Note : Attempt any five questions. Each question carries 4 marks. **5×4=20**

Q. 3. Short answer type (250 words) :

(i) Draw combined orgel diagram for d^1, d^4 complexes.

(ii) Explain HSAB principle. Discuss its application.

(iii) What are the functions of haemoglobin and myoglobin ? What are similarities and differences in the structures ?

(iv) Discuss the bonding in metal carbonyl complexes, its nature of bonding. Explain.

(v) What are the factors which effect the stability of complex ? Discuss.

(vi) Discuss the preparation and structure of metallo carboranes.

(vii) Write short notes on oxidation state of lanthanides.

SECTION - D

Note : Attempt any three questions. Each question carries 10 marks. **10×3=30**

Q. 4. Essay type (more than 500 words) :

(i) What do you mean by Tanabe Sugano diagram ? Explain for transition metal complexes d^1 to d^9 state.

(ii) (a) What is nitrogenase ? What role does it play in nitrogen fixation ?

(b) Write notes on colour and spectral, magnetic properties of lanthanide and actinide.

(iii) (a) Give a brief account of Optical Rotator Dispersion (ORD).

(b) Write and explain Lewis acid base concept and its application.

(iv) (a) What are nanomaterials ? Its characterization & application of nanotechnology.

(b) Write notes on spin orbital coupling.