**Printed Pages : 8**

# F-6321

## M.Sc. (II$^{nd}$ Semester) (CBCS Main) Examination, 2021

## CHEMISTRY

## ( Inorganic Chemistry - 2 )

***Time Allowed : Three Hours***

***Maximum Marks : 70***
***Minimum Passing Parks : 25***

**Note :** Attempt questions from all **four** sections as directed. The marks given in right hand side indicate full marks.

### SECTION-A

### (Objective Type Questeions)

**Note :** Attempt **any ten** questions. Each question carries **One** marks.

[1x10=10]

1. (i) As per the Bronsted and Lowry concept, a Base is substance that :

(a) Accepts proton

(b) Donates proton

(c) Accepts neutron

(d) Donates neutron

(ii) Which of these is not an acid, despite being a Hydrogen compound?

(a) $CH_4$

(b) $CCl_3COOH$

(c) $H_2S$

(d) HF

(iii) Which of the following cannot be a Ligand?

(a) $Ni^{2+}$

(b) $Cl^-$

(c) $H_2O$

(d) $NH_3$

(iv) How many donor atoms can $EDTA^{4-}$ Ligand bind through ?

(a) 2

(b) 4

(c) 6

(d) 8

(v) Carboxypeptidase contains :

(a) Zn (II) and Hydrolysis $CO_2$

(b) Mg (II) and Hydrolysis peptide bond

(c) Mg (II) and Hydrolysis $CO_2$

(d) Zn (II) and Hydrolysis peptide bonds

(vi) The Ligand system present in vitamin B12 is :

(a) Porphyrin

(b) Corrin

(c) Phthalocyanine

(d) Crown ether

(vii) What is the general electronic configuration of the Lanthanides?

(a) $(n-2)f^{1-14}(n-1)d^{1-10}ns^{2}$

(b) $(n-2)f^{1-14}(n-1)d^{1-20}ns^{2}$

(c) $(n-2)f^{1-14}(n-1)d^{0-1}ns^{2}$

(d) $(n-2)f^{1-14}(n-1)d^{0}ns^{2}$

(viii) What is the most common oxidation state of Lanthanide?

(a) +2

(b) +4

(c) +6

(d) +3

(ix) Actinoid compound are more basic than Lanthanoid compound.

(a) True

(b) False

(x) According to Wade's rule, cluster $[Os_3(CO)_{12}]$ is type of _____ .

(xi) The ground state term for chromium ion in $[Cr(CN)_6]^{4-}$ is _____.

(xii) The colour of the nano-gold particles is _____.

## SECTION-B

### (Very Short Answer Questions)

**Note :** Attempt **any five** questions. Each question carries **2** marks. (**25-30** words only) [2x5=10]

2. (i) What is spectroscopic ground state "term symbol" explain with suitable example.

(ii) What do you meant by Buffer solutions?

(iii) What is Carboranes? Also give the classification of carboranes.

(iv) Write the role of sodium and Zn ions.

(v) What is stability constant?

(vi) Write the oxidation state of Lanthanoids and Actinoides.

(vii) Give two example of Iron-Sulphur proteins.

## SECTION-C

## (Short Answer Type Questions)

**Note :** Attempt **any five** questions. Each question carries **4** marks. (**250** words only) [4x5=20]

3. (i) Evaluate spectroscopic ground state for electronic configuration from $d^1$, $d^3$, $d^5$ and $d^{10}$.

(ii) What do you mean by metal cluster? Write down two categories of metal cluster.

(iii) Describe the Werner's theory and its application.

(iv) Explain the Carbory peptidase and Carbonic anhydrase.

(v) Write the concept of Lewis acid-base and its applications.

(vi) Discuss the electronic configuration and oxidation state of Lanthanoids and Actinoids.

(vii) Write a short note on Nano-technology.

## SECTION-D

## (Essay Type Questions)

**Note :** Attempt **any three** questions. Each question carries **ten** marks. (more than **500** words) [3x10=30]

4. (i) (a) Discuss the colour and spectral properties of Lanthanoids.

(b) What is Lanthanides contraction? Also discuss its effect and consequences.

(ii) Write short notes on the following :

(a) Nitrogen fixation

(b) Effective Atomic Number (EAN)

(c) Magnetic properties of Lanthanides

(iii) Discuss charge Transfer Spectra. Draw moleculer orbital diagram for LMCT and MLCT and give suitable example.

(iv) (a) Describe the HSAB concept and its application.

(b) Explain metal carbonyl compound, its classification, preparation and structures.

----x----