



**NAVRACHANA
UNIVERSITY**
a UGC recognized University

School: School of Science
Program/s: B.Sc.(chemistry)
Year: 2nd **Semester:** 3rd
Examination: End Semester Examination
Examination year: December - 2021

Course Code: CH256 **Course Name:** Inorganic chemistry II

Date: 02/12/2021

Time: 08:30 am to 10:30 am

Total Marks: 40

Total Pages: 2

Instructions:

- Write each answer on a new page.
- Use of a calculator is permitted.
- * COs=Course Outcome mapping. # BTL=Bloom's Taxonomy Level mapping

Q. No.	Details	Marks	COs*	BTL#			
Q.1	<p>(a) Answer any <u>two out of five</u> from the following questions (each carry 5 marks)</p> <p>(i) Explain in detail about the Born-Haber cycle for the formation of NaCl.</p> <p>(ii) Why we are able to see steady decrease in atomic and ionic radii in case of $(n-2)f^{1-14}(n-1)d^{0-1}ns^2$ series. What are its consequences.</p> <p>(iii) Write about the differences in properties of first element of group I with other elements of same group.</p> <p>(iv) Explain about the chemical properties of s-block elements hydrides.</p> <p>(v) Explain flow chart for the leaching, extraction and conversion of uranium in detail.</p>	10	CO1 CO2	BT1, BT2 BT3 BT4 BT5			
	<p>(b) Answer any <u>four out of six</u> from the following questions (each carry 2 marks)</p> <p>(i) What is the reason, why compounds of beryllium (Be) are much more covalent than other group II compounds?</p> <p>(ii) Write the chemical reaction of xenon fluorides with fluoride ion acceptors to form ionic compounds.</p> <p>(iii) Explain about the paper chromatography for the separation of lanthanides.</p> <p>(iv) Why we are not able to see the $[Xe]4f^2 5d^0 6s^2$ electronic configuration for the cerium.</p> <p>(v) Write about the uses of tin.</p> <p>(vi) Explain the +4 oxidation states for Actinide series.</p>				08	CO3 CO4	BT1, BT2 BT3 BT4 BT5
	<p>(c) Answer the following in short (each carry 1 marks)</p> <p>(i) Write true or false: For the extraction of lanthanides R_f value increase with increases with morality of eluting agents and temperature.</p> <p>(ii) Write true or false: Ammonia, amines and alkali hydroxides are use to precipitate out cerium group lanthanides.</p> <p>(iii) Write the composition of xenotime mineral.</p> <p>(iv) Write the potential application of americium.</p> <p>(v) Write the chemical formula of arsenopyrites, realgar and orpiment.</p> <p>(vi) What will be the composition of mustard gas.</p> <p>(vii) What will be the name of the compound having see-saw shape and sp^3d hybridization.</p> <p>(viii) Criserite is mineral for which element.</p>						
			P.T.O.				

Q.2	(a) Answer the following questions	05	CO1 CO3 CO4	BT1, BT2
	(i) Explain in detail the crystal field splitting in both octahedral and tetrahedral complexes with examples.	03		BT3 BT4 BT5
	(ii) The magnetic moment of $[\text{MnBr}_4]^{2-}$ ion is 5.9 BM. On basis of VBT, find out the type of hybridisation and geometry of the ion.	02		
	(iii) How does the spin system (high spin versus low spin complexes) of a molecule play a role in Jahn-Teller effects?	04		
	(b) Answer the following in short (Write only correct option in answer sheet)			
	(i) Which of the following complex ions is not expected to absorb visible light? (A) $[\text{Ni}(\text{CN})_4]^{2-}$ (C) $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$ (B) $[\text{Cr}(\text{NH})_6]^{3+}$ (D) $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$			
	(ii) A chelating agent has two or more than two donor atoms to bind to a single metal ion. Which of the following is not a chelating agent? (A) Glycinato (B) Ethylene diamine (C) Triphenyl phosphine (D) Thiosulphato			BT1, BT2 BT3 BT4 BT5
	(iii) The sum of coordination number and oxidation number of the metal M in the complex $[\text{M} \cdot \text{P}(\text{CH}_3)_3(\text{C}_2\text{O}_4)]\text{Cl}$. (A) 9 (B) 6 (C) 7 (D) 8			
	(iv) The magnetic moment of the complex is 2.82 BM. The complex ion is... (A) $[\text{V}(\text{H}_2\text{O})_6]^{3+}$ (B) $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$ (C) $[\text{Cu}(\text{CN})_4]^{2-}$ (D) $[\text{MnCl}_4]^{2-}$			

*****End of Question Paper*****