Name: Enrolment No:	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2021

Course: Inorganic Chemistry-III **Semester: IV**
Programme: B. Sc. Chemistry **Time: 3 hours**
Course Code: CHEM2004 **Max. Marks: 100**

SECTION A

1. Each Question will carry 5 Marks
2. Instruction: Complete the statement / Select the correct answer(s)/Describe briefly

S. No.	Question	Marks	CO
Q 1	Write the electronic configurations of (i) Uranium (ii) Gadolinium	5	CO1
Q 2	(i) Write three properties of transition metals that are different from alkali metals. (ii) How do the atomic radii of transition elements vary with increase in atomic number in any series?	5	CO1
Q 3	Define (i) Inert complexes (ii) Labile complexes	5	CO1
Q 4	(i) Write any one-preparation reaction of $CrCl_3$. (ii) Which gas evolved when potassium ferrocyanide reacts with concentrated sulfuric acid? Explain with the help of chemical reaction.	5	CO2
Q 5	(i) What are two major drawbacks of Werner's theory? (ii) Define lanthanide contraction.	5	CO1
Q 6	(i) State the reason for color of $KMnO_4$. (ii) State the application of sodium nitroprusside. Also, write the oxidation state of Fe in sodium nitroprusside.	5	CO2

SECTION B

1. Each question will carry 10 marks
2. Instruction: Give the answers in detail. Choice is given for Q 5.

Q 1	Distinguish between Z-in & Z-out Jahn-Teller distortion with example.	10	CO1
Q 2	Briefly discuss nomenclature rules for systematic naming of coordination compounds.	10	CO1
Q 3	Describe the mechanism of dissociative and associative substitution reaction in transition metal octahedral complexes by taking suitable example.	10	CO3
Q 4	What do you mean by trans effect in substitution reaction of square planar transition metal complexes? Explain in detail.	10	CO3
Q 5	Explain the preparation and structure of $K_2Cr_2O_7$. Describe at least three important chemical properties.	10	CO2

	OR Describe the synthesis and structure of sodium cobaltinitrite. Discuss its application in detection of potassium.		
Section C **1. Each Question carries 20 Marks.** **2. Instruction: Write long answer.**			
Q 1	**(i)** When do some lanthanides prefer to have oxidation number +2, +4 in addition to regular +3, oxidation number? Explain with two examples **OR** Explain any two methods followed for purification of lanthanides. **(ii)** Describe preparation and structure of $K_4Fe(CN)_6$. Explain the reaction of $K_4Fe(CN)_6$ with Na metal and Cl_2 gas. **OR** Describe preparation reaction of $KMnO_4$ along with its structure. Describe its application as oxidizing agent for organic compound containing aldehyde and alcohols functional groups.	**10** **10**	**CO1**