Name: **Enrolment No:**	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, Dec 2022

Course: Inorganic Chemistry-II **Semester : IIIrd**
Program: B.Sc. Hons. Chemistry and Int. B.Sc.-M.Sc. Chemistry

Time : 03 hrs.
Course Code: CHEM 2020 **Max. Marks: 100**

Instructions: Complete the statements

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Among the hydrides of group 15 elements (NH_3, PH_3, AsH_3 and SbH_3), SbH_3 is almost not basic. Explain with reason.	**4**	**CO3**
Q 2	Write a short note on pseudohalides. What are their important characteristics?	**4**	**CO2** **CO3**
Q 3	Explain the following: (a) Diamond is non-conductor while graphite is a good conductor of electricity. (b) Pb^{4+} compounds are oxidizing in nature.	**4**	**CO3**
Q 4	What are clathrate compounds of noble gases? Discuss their formation with the help of an example.	**4**	**CO2**
Q 5	Give at least two examples to show that water can behave both as an acid and a base under suitable conditions.	**4**	**CO2**

SECTION B
(4Qx10M= 40 Marks)

Q 6	Describe the detailed structure of diborane, B_2H_6. How many 2c-$2e^-$ and 3c-$2e^-$ bonds are present in B_2H_6?	**10**	**CO2**
Q 7	What is the froth floatation process for separation of sulfides in metallurgy. Explain with the help of a diagram. Discuss the role of a depressant in this process? OR	**10**	**CO1**

	Describe the coordination chemistry of NO in complex $Na_2[Fe(CN)_5NO]$. Is this complex paramagnetic in nature?		
Q 8	(i) What are *Lewis acids*? Arrange the following in the order of increasing acid strength with proper reasoning: (a) BCl_3, BF_3, BBr_3; (b) $SnCl_2$, $SnCl_4$. (ii) What are *Lewis bases*? Arrange the following in the order of decreasing base strength: (a) NH_3, NCl_3, NF_3; (b) NH_3, PH_3, AsH_3.	**5+5**	**CO2**
Q 9	Draw the structure of the following compounds using VSEPR theory: (a) XeF_2 (b) XeF_4 (c) XeO_2F_2 (d) XeF_6	**10**	**CO3**
SECTION-C (2Qx20M=40 Marks)			
Q 10	Discuss the electronic structure of following compounds (a) Chlorophosphazines (b) Borazines (c) Graphite (d) *ortho*- and *pyro*-silicates	**5+5+5+5**	**CO3**
Q 11	(i) Explain the following methods in details: (a) Kroll's process (b) Electrorefining of Na (ii) In Ellingham diagram of different oxides, the line for the reaction C (s) + O_2 (g) → CO_2 (g) is nearly horizontal whereas the line for 2C(s) + O_2 (g) → 2CO (g) slopes sharply downward. Why it is so? OR Explain the following statements: (a) Hard acids coordinate with hard bases and soft acids coordinate with soft bases. (b) BF_3 readily combines with F^- ion to form stable complex BF_4^-. (c) AgI_2^- complex is stable but AgF_2^- is not. (d) *o*-nitro benzoic acid is the most acidic among its *o*-, *m*- and *p*-isomers.	**20**	**CO1 CO3**