

SG-547

Total No. of Pages : 3

Seat No.	
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M.Sc. (Part - I) (Semester - II) (NEP) Examination, March - 2023
CHEMISTRY/APPLIED CHEMISTRY/INDUSTRIAL CHEMISTRY
Inorganic Chemistry-II (Paper-V)
Sub. Code : 90163/90073

Day and Date : Tuesday, 13 - 06 - 2023

Total Marks: 80

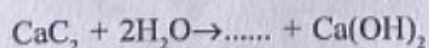
Time : 10.30 a.m. to 1.30 p.m.

- Instructions:
- 1) Attempt in all Five questions.
 - 2) Question No. One is compulsory.
 - 3) All questions are equal marks.
 - 4) Attempt any two questions from Section-I and any two questions from Section-II.
 - 5) All sections should be written in the same answer book.
 - 6) Figures to the right indicate full marks.
 - 7) Neat labeled diagram should be drawn wherever necessary.

Q1) Answer the following.

[16]

- a) "Lanthanide complexes are usually coloured". Why?
- b) Who discovered the Uranium?
- c) "The spectral lines from the actinides are 10 times as intense as lanthanides". Why?
- d) Which is the most rapid method for separation of lanthanides?
- e) In Frenkel defect, the observed density is _____ as theoretical density.
- f) What is the effect of temperature on electrical conductivity of conductors?
- g) What is function of Haemoglobin?
- h) Which metals helps in nitrogen fixation process?
- i) "HF has highest boiling point to that of its corresponding hydrogen halides". Why?
- j) What is the product of following reaction?



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- k) Write the formula of arachno boranes.
- l) What are allotropic forms of phosphorous?
- m) How many lone pairs are found in XeF_2 species?
- n) Among PH_3 and PF_3 , which species has more bond angle and why?
- o) Perchloric acid behaves as _____ In anhydrous sulphuric acids.
- p) What is non-aqueous solvent?

SECTION-I

- Q2) a) What do you mean by the crystal defects? Explain different types of crystal defects in solids? [8]
- b) Write note on synthesis and properties in boranes. [4]
- c) Explain colour and absorption spectra of actinide. [4]
- Q3) a) Discuss the physical and chemical properties of liquid ammonia and sulphur dioxide. [8]
- b) Explain the Bent rule with illustrations. [4]
- c) Write note on Phosphazenes. [4]
- Q4) a) What is polymorphism? Discuss the polymorphism of Carbon. [8]
- b) Explain the mechanism of nitrogen fixation. What are the enzymes involved in nitrogen fixation. [4]
- c) Explain applications of actinide compounds in industries. [4]

SECTION -II

- Q5) a) Write the general electronic configuration of lanthanoids. Discuss the optical and magnetic properties of lanthanides with suitable examples. [8]
- b) How S_4N_4 is prepared? Draw its structure. [4]

c) Explain structure and bonding in interhalogens. [4]

Q6) a) How VSEPR theory is useful for predicting the geometry of representative compounds? Explain with at least two examples of compounds having AB_2 , AB_3 , AB_4 formulae. [8]

b) Calculate the distance between Na^+ and Cl^- ions in NaCl with a density 2.165 g/cm^{-3} ? [4]

c) Explain conductor, insulator and semiconductor from band theory. [4]

Q7) Write short notes on any three of the followings: [16]

a) Physical and Chemical properties of sulphur dioxide.

b) $p\pi-d\pi$ bonding and $d\pi-d\pi$ bonding with examples

c) Oxoacids of sulphur.

d) Applications of f-block compounds in Industries.

e) Walsh diagram.

