

Roll No.

41201

**B. Sc. (Pass Course) 4th Semester
Examination – May, 2019**

CHEMISTRY - I (Inorganic Chemistry)

Paper : CII-401

Time : Three hours] [Maximum Marks : 29

Before answering the questions candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question Number 1 is *compulsory*. All questions carry equal marks.

1. **Compulsory Questions :** 5 × 1 = 5

- (a) Name the three tripositive lanthanide ions which are colourless.
- (b) Why is Eu(II) more stable than Ce(II) ?

(iii) Lanthanide ions are expected to form ionic compounds.

SECTION – B

4. Explain the following in case of actinides : 3 × 2 = 6

- (i) Oxidation state
(ii) Magnetic properties
(iii) Actinide contraction

5. (a) Explain why heavier members of the actinide series do not form oxocations.

(b) Giving *two* examples, describe the method of preparation of transuranium elements through transmutation with high energy particles.

SECTION – C

6. (a) How is Ni detected in the presence of Co ? Describe the theory of the process. 3

(b) Give the chemistry of the following tests in qualitative inorganic analysis : 3

- (i) Dilute H_2SO_4 test
(ii) Concentrated H_2SO_4 test

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- (c) Actinides have greater tendency to form complex than lanthanides. Explain.
- (d) Why is H_2S gas passed through solution in acidic medium to precipitate second group radicals ?
- (e) Which complex is formed when NO_2 gas reacts with $FeSO_4$ to form black solution ? Discuss the reaction.

SECTION - A

2. (a) Amongst La(57), Sm(62), Gd (64) and Yb (70) : 3
- (i) Which element will give coloured ion ?
- (ii) Which element will give paramagnetic ion ?
- (iii) What are possible oxidation states ?
- (b) Write short notes on : 3
- (i) Lanthanide Contraction
- (ii) Ion exchange method for separation of lanthanide
3. Give the suitable reasons for the following : 6
- (i) Yb, Ho and Er occur together in natural minerals
- (ii) Eu and Yb have lower melting point and boiling point as compared to other lanthanide elements

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7. (a) Explain the chemistry of chromyl chloride test. 3
- (b) What happens when : 3
- (i) Ferric chloride solution reacts with $K_4[Fe(CN)_6]$ solution ?
- (ii) Tin(II) chloride is added to mercury(II) chloride ?

SECTION - D

8. Give main differences between : 3 × 2 = 6
- (a) Co-precipitation and post-precipitation
- (b) Digestion and warming the precipitates
- (c) Solubility product and ionic product
9. How will you distinguish between : 3 × 2 = 6
- (a) NO_2^- and NO_3^-
- (b) SO_4^{2-} and $S_2O_3^{2-}$
- (c) CO_3^{2-} and $C_2O_4^{2-}$

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