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*** : $5 \times 1 = 5$

   (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 ic compounds.

SECTION – B

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

   (i) Oxidation state

   (ii) Magnetic properties

   (iii) Actinide contraction

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

   (b) Giving ***two*** examples, describe the method preparation of transuranium elements throug 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

(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

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 : $3 \times 2 = 6$

(a) Co-precipitation and post-precipitation

(b) Digestion and warming the precipitates

(c) Solubility product and ionic product

9. How will you distinguish between : $3 \times 2 = 6$

(a) NO_2^- and NO_3^-

(b) SO_4^{2-} and $S_2O_3^{2-}$

(c) CO_3^{2-} and $C_2O_4^{2-}$