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Roll No. ....

ID—6230

B.Sc. (Biotech)/B.Sc. (Pass Course)

EXAMINATION, 2022

(Fourth Semester)

(Batch 2020-2021)

CHEMISTRY-I

Code : CH-401/CH(11)-401

Inorganic Chemistry (Theory)

Time : 3 Hours

Maximum Marks : 29

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

**Note :** Attempt *Five* questions in all, selecting *one* question from each Section. Q. No. 1 is compulsory.

1. (a) What are f-block elements ? Why are they so called ? 1
- (b) Write the formula of Nessler's reagent. 1
- (c) Write group reagent for detection of group-I basic radicals. 1
- (d) What are transuranic elements ? Give two nuclear reactions which are used in synthesis of these elements. 1
- (e) Which element has the highest melting point and boiling point in actinides ? 1

#### Section A

2. (a) Name the type of compounds formed by lanthanides and list important uses of lanthanide compounds. 3
- (b) Discuss Ion exchange method for separation of lanthanides. 3
3. (a) Why do lanthanides have poor tendency to form complexes ? Explain. 2
- (b) What are the problems in separation of lanthanides from one another ? 2
- (c) Which is more basic and why— $\text{Cd}_2\text{O}_3$  or  $\text{YbO}$  ? 2

### Section B

4. (a) Write electronic configuration of all elements of actinides and discuss the way in which the actinides resemble their lanthanide congeners. 3
- (b) Differentiate between lanthanides and actinides. 3
5. (a) Actinides have greater tendency to form complexes than lanthanides. Explain. 3
- (b) Give points of comparison between f-block elements and transition elements. 3

### Section C

6. (a) What happens when : 3
- (i) Ferric chloride solution reacts with  $K_4[Fe(CN)_6]$  ?
- (ii) Tin (II) chloride is added to Mercury II chloride ?

- (b) Define solubility product. How this concept is useful in explaining the phenomenon of precipitation ? 3
7. (a) Discuss the reactions for the following : 3
- (i) Silver nitrate test for thiosulphates.
- (ii) Sodium nitroprusside test for sulphides.
- (b) Explain Chromyl Chloride method for detection of Chloride ion and Match stick test for Sulphates. 3

### Section D

8. (a) How will you detect Cadmium in presence of Copper ? Describe the theory in detail. 3
- (b) Explain the following : 3
- (i) Significance of digestion
- (ii) Importance of pH value in qualitative analysis of III group.

9. (a) Presence of  $\text{NH}_4\text{Cl}$  and  $\text{NH}_4\text{OH}$  is essential before addition of  $(\text{NH}_4)_2\text{CO}_3$  for analysis of group V. Explain. 3
- (b) Discuss the chemistry involved in confirmatory test of  $\text{Ba}^{+}$ ,  $\text{Sr}^{+2}$  and  $\text{Ca}^{+2}$ . 3

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