

Roll No.

Total Pages : 04

GSM/M-21

1622

CHEMISTRY

Inorganic Chemistry

Paper : XI

CH-204

Time : Three Hours]

[Maximum Marks : 32

Note : Attempt *Five* questions in all, selecting *two* questions from each Section. Q. No. 1 is compulsory. Marks are indicated against each question.

1. (i) Name the most stable lanthanide nitrate.
- (ii) What happens when Ce(III) nitrate is treated with alkaline KMnO_4 ?
- (iii) Which of the following has maximum number of unpaired electrons ?
 Th^{4+} , U^{3+} , Pu^{3+} , Pa^{4+} .
- (iv) Complete the following reaction :
$${}_{92}\text{U}^{238} + ? \longrightarrow {}_{99}\text{Es}^{247} + 5{}_0^1n$$
- (v) Lanthanides do not form double salts with 24 water molecules as in alums. Why ?
- (vi) What is Original Solution ?

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(vii) Write down the structure of Nickel (II) dimethylglyoximate.

(viii) What is Magnesia Mixture ? 1×8=8

Section A

2. (a) Lanthanides show +3 as a common oxidation state but only few of them exhibit +2 and +4. Explain. 2
- (b) The spectra of lanthanides show sharp line-like bands. Give reasons for your answer. 2
- (c) Lanthanides prefer to form ionic compounds. Why ? 2
3. (a) Write down the electronic configuration of samarium ($Z = 62$) and Europium ($Z = 63$). 2
- (b) Discuss briefly any *two* methods for the separation of lanthanides. 3
- (c) Which actinides are used as Nuclear fuel ? 1
4. (a) Why heavier members of actinide series do not form oxocations ? 2
- (b) What is Nuclear fission ? Give reactions for it. 2
- (c) Why is chemistry of actinides more complex as compared to lanthanides ? 2

5. (a) Why do magnetic properties of actinides appear more difficult to interpret than both transition metals and lanthanides ? 2
- (b) Is there an actinide contraction similar to the lanthanide contraction ? Explain. 2
- (c) Name two important minerals of lanthanides. 2

Section B

6. (a) What is Sodium Carbonate Extract ? How is it prepared ? 2
- (b) What is the role of HCl detection of group II basic radicals ? 2
- (c) What is solubility product ? How does it differ from ionic product ? 2
7. (a) What are the group reagents for group IV and V. 2
- (b) Complete the following reactions : 2
- (i) $\text{FeSO}_4 + \text{NO}_2 + \text{H}_2\text{SO}_4 \longrightarrow ? + ?$
- (ii) $\text{Na}_2\text{S} + \text{Na}_2[\text{Fe}(\text{CN})_5\text{NO}] \longrightarrow ?$
- (c) How will you detect CO^{2+} in the presence of Ni^{2+} ? 2
8. (a) (i) Why conc. HN_3 is added in group III analysis ?
- (ii) Why Zn^{2+} does not precipitate with Cd^{2+} in group II ? 2

- (b) (i) Explain the chemistry of Match stick test for sulphates.
- (ii) Name the cation which give bluish green colour to the flame. **2**
- (c) How does pH of the solution affect solubility of precipitates ? **2**
9. (a) Why is H_2S gas passed in acidic medium to precipitate cations of group II ? **2**
- (b) What is simultaneous precipitation ? **2**
- (c) How will you test for Ca^{2+} ion ? **2**