Roll No. ..... **Total No. of Pages : 2**

PC 11451-NH

BS/2111
INORGANIC CHEMISTRY—I
Semester—III

Time Allowed : Three Hours] [Maximum Marks : 26

Note :– The candidates are required to attempt *two* questions each from Sections A and B. Section C will be compulsory.

SECTION—A

1. Explain the following :
   (a) All transition metals exhibit variable valency.
   (b) Transition metals show catalytic properties.
   (c) Most of transition metal ions are coloured.
   (d) Transition elements have tendency to form complexes. 1×4=4
2. (a) What are d-block elements ? How they differ from s-and p-block elements ? 2
   (b) Describe the preparation of $KMnO_4$ from pyrolusite.Mention one of its oxidising reaction in each of the acidic, basic and neutral medium. 2
3. What do you mean by lanthanide contraction ? Mention its cause and consequences. 4
4. (a) How are lanthanides separated from each other by ion-exchange method ? 2
   (b) How does titanium occur in nature ? Discuss its general characteristics. 2

SECTION—B

5. Explain :
   (a) First ionisation enthalpy of 5d elements are higher than those of 3d and 4d elements. 2
   (b) Hg differs from Zn and Cd in reactivity. 2
6. Give points of similarities and differences between lanthanides and actinides. 4
7. Compare the first transition series with 2^{nd} and 3^{rd} transition series in terms of :
   (a) Ionisation Enthalpies
   (b) Complex formation
   (c) Magnetic properties
   (d) Metallic Bonding. 1×4=4
8. (a) How is uranium extracted from its ores ? 2
   (b) Discuss the magnetic properties of actinides. 2

SECTION—C

9. (a) Which is a better oxidising agent, Co^{2+} or Co^{3+} in water ? 2
   (b) Lanthanides do not form oxo-cations. 2
   (c) Cu^{+1} compounds are colourless and diamagnetic while Cu^{2+} compounds are coloured and paramagnetic. Why ? 2
   (d) Explain the stereochemistry of :
      (i) $[PtCl_3]^{2-}$
      (ii) $[HgI_3]^{-}$ 2
   (e) Write a note on the preparation of transuranic elements. 2