(b) Discuss the binary compounds of titanium (IV) oxidation state and complexes of titanium. 4

7. (a) How the co-ordination number 4 and 5 in transition metal complexes will decide the geometry of the molecules ? 4

(b) What is d-d transition ? How does it cause the colour in the compounds of transition elements ? 2

(c) What are the important oxidation states of cobalt and nickel ? 2

Section–D

8. (a) Discuss oxides and halides of cobalt in II and complexes in III oxidation states. 5

(b) Explain the oxides and halides of chromium in VI oxidation state. 3

9. (a) Discuss the chemistry of oxides of Manganese in II, III and IV oxidation states. 4

(b) Explain briefly the iron compounds in II and III oxidation states. 4

B.Sc. 3rd Semester (Hons) New Scheme

Examination, December–2015

CHEMISTRY

Paper–CH(H)–201 XVIII

Inorganic Chemistry

Time allowed : 3 hours] *[Maximum marks : 40*

*Note : Attempt **five** questions in all, selecting **one** question from each section. **Question No. 1 is compulsory**. All questions carry equal marks.*

1. (a) Why does NH_3 readily form complexes but NH_4^+ does not ? Explain.

(b) What are ambidentate ligands ? Give one example.

(c) What is meant by disproportionation ?

(d) Explain why solutions of sodium in liquid NH_3 are blue and good reducing reagents.

(e) Why does Mn (II) show maximum paramagnetic character among the bivalent ions of first transition series ?

(f) Cu^{2+} is more stable than Cu^{+}. Explain.

(g) What will happen when acidified chromate is treated with H_2O_2 ?

(h) MnO is basic whereas Mn_2O_7 is acidic. Why ?

1×8

Section–A

2. (a) What are chelates ? Discuss the factors which affect the stability of chelates. 4

(b) Write the IUPAC names of the following :

(i) $[Cr(en)_2C\ell_2]_2\,[PdC\ell_4]$

(ii) $[PtC\ell_2\,(C_5H_5N)\,(NH_3)]$

(iii) $[Co(NH_3)_3\,(NO_2)\,C\ell_2]$

(iv) $K_3\,[A\ell\,(C_2O_4)_3]$ 4

3. (a) Define geometrical isomerism and discuss geometrical isomerism of compounds with coordination number 4 and 6. 6

(b) What are outer orbital and inner orbital complexes ? Give examples. 2

Section–B

4. (a) Explain Pourbaix diagram for some naturally occuring iron compounds. 5

(b) What is a redox cycle ? Discuss analysis of redox cycle. 3

5. (a) Account for the following :

(i) K_2SO_3 is soluble in SO_2

(ii) SO_2 acts both as a Lewis acid and base. 3

(b) List four properties of liquid NH_3 which make it a better solvent than water. Describe the following reactions in liquid NH_3 :-

(i) Solvolytic and

(ii) Acid base neutralisation reactions. 5

Section–C

6. (a) Describe the general characteristics of d-block elements w.r.t.

(i) Atomic and ionic radii

(ii) Ionisation energies. 4