CHEMISTRY

1. Which of the following is an important factor in accounting for the occurrence of much more frequent metal –metal bonding in compounds of the heavy transition metals ?

   1) High enthalpy of atomization of heavier metals

   2) Low enthalpy of atomization of heavier metals

   3) High IP_1 value of heavier metals

   4) Low IP_1 value of heavier metals

2. Cr^{2+} acts as reducing agent and Mn^{3+} acts as oxidizing agent even though both have d^4 configuration. The reason is

   1) $E^0\left(Mn^{3+}/Mn^{2+}\right)=+Ve$ and $E^0\left(Cr^{2+}/Cr^{3+}\right)=+Ve$

   2) $E^0\left(Mn^{3+}/Mn^{2+}\right)=-Ve$ and $E^0\left(Cr^{3+}/Cr^{2+}\right)=-Ve$

   3) Cr^{3+} has half-filled ‘d’ configuration and Mn^{2+} has half filled t_{2g} level

   4) Cr^{2+} has half –filled t_{2g} level and Mn^{3+} has half-filled ‘d’ configuration

3. Transition element which exihibits typical metal (complex) structure.

1) Mn 2) Co 3) Ni 4) Cu

4. Which of the following ground state outer most orbitals configuration represents transition element?

1) $.....4d^{10}$ 2) $.....5f^{7}6d^{1}7s^{2}$ 3) $.....3d^{10}4s^{2}$ 4) $.....4f^{14}5d^{1}6s^{2}$

5. Which of the following acts as strong oxidizing agent in acidic medium (H_2SO_4)?

1) $Cr_2O_7^{2-}(VI)$ 2) $MoO_3(VI)$ 3) $WO_3(VI)$ 4) All

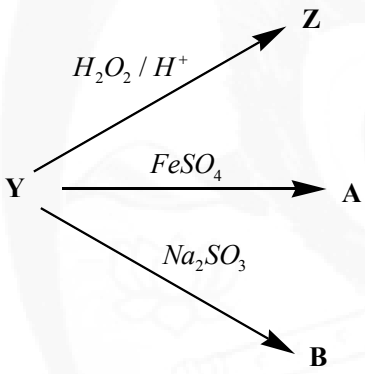
6. Ferrates are formed in alkaline media but they readily decompose to Fe_2O_3 and O_2. Then oxidation state of Fe in ferrates is

1) $+8/3$ 2) $+3/8$ 3) +6 4) +2

7. $I^- \rightarrow IO_3^-$ this change is possible by

1) MnO_4^- / H^+ 2) $Cr_2O_7^{2-} / H^+$ 3) MnO_4^- / H_2O 4) $S_2O_3^{2-}$

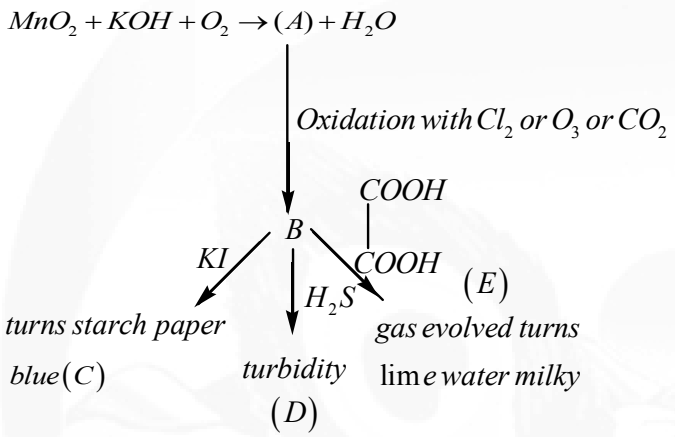
8. $Na_2CrO_4 \xrightarrow{Conc.H_2SO_4} Y$



In which of the following compounds the central atom exhibits +6 oxidation state.

1) Z only 2) A only 3) B only 4) Y, Z, A & B

9.



In which of the following chalcogen is not present?

1) A 2) B 3) C 4) D & E

10. $AgBr + Na_2S_2O_3 \rightarrow X(complex)$ the dentacity of the ligand attached to metal is

_____

1) 1 2) 2 3) 3 4) 4

11. $ZnO + Co(NO_3)_2 \xrightarrow{A} X(containing\ Zn)$ where X is

1) Zn.CO 2) $CoZnO_2$ 3) Zn 4) $Zn(NO_3)_2$

12. Which of the following does not form ammonia complexes?

1) Fe 2) Ni^{2+} 3) Co^{2+} 4) Both Ni^{2+} & Co^{2+}

13. When $K_2Cr_2O_7$ crystals are heated with $conc.H_2SO_4$ or $conc.H_2SO_4 + conc.HCl$ the deep red colour of the gas X evolved, where X is

1) K_2MnO_4 2) CrO_5 3) CrO_4^{2-} 4) CrO_2Cl_2

14. If excess of $AgNO_3$ solution is added to 100 ml of a 0.024M solution of dichlorobis (ethylenediamine) cobalt (III) chloride, how many moles of AgCl will be precipitated

1) 0.0024 2) 0.0012 3) 0.0048 4) 0.0036

15. The CFSE (Δ_0) for $[CoCl_6]^{4-}$ complex corresponds to 18000 cm^{-1}. The (Δt) for $[CoCl_4]^{2-}$ may correspond to

1) $18000cm^{-1}$ 2) $16000cm^{-1}$ 3) $8000cm^{-1}$ 4) $2000cm^{-1}$

16. Which of the following is coloured due to charge transfer phenomenon? [Visible Region]

1) TcO_4^- 2) ReO_4^- 3) TcO_4^- & ReO_4^- 4) MnO_4^-

17. The maximum possible number of geometrical isomers to the following complex $\left[Pt(NH_3)(NH_2OH)(NO_2)(Py)\right]NO_2$ are

1) 1 2) 2 3) 3 4) 4

18. How many H-bonds are present in the complex entity (coordination number 4) formed from Ni^{2+} and dimethylglyoxime

1) 2 2) 3 3) 4 4) 5

19. A weak field complex of Ni^{2+} has magnetic moment of 2.82 BM. The number of electrons in t_{2g} level of Ni^{2+} will be

1) 3 2) 4 3) 5 4) 6

20. IUPAC name of $\left[Co(en)_3\right]\left[Cr(ox)_3\right]$ is

1) Cobalt (III) (ethane-1,2-diamine) trisoxalato chromate (III)

2) Tris (ethane-1,2-diamine) cobalt (II) trioxalato chromate (II)

3) Tris (ethane-1,2-diamine) cobalt (III) trioxalato chromate (III)

4) Triethene diammine cobalt(III) trisoxalato chromium (III)

21. The alloy which does not contain copper and zinc as constituents is

1) German silver 2) Gun metal

3) Devardas alloy 4) Magnalium

22. MnO_2 is catalyst in the reaction $2KClO_3 \rightarrow 2KCl + 3O_2$. Which of the following oxidation state of Mn is not involved in the reactions ?

1) +7 2) +6 3) +4 4) +2

23. Incorrect statement is

1) $\left[Co(NH_3)_4 Cl_2\right]SO_4$ shows ionization isomerism

2) $\left[CoBr(NH_3)_3(H_2O)_2\right]Cl$ shows hydrate and ionization isomerisms

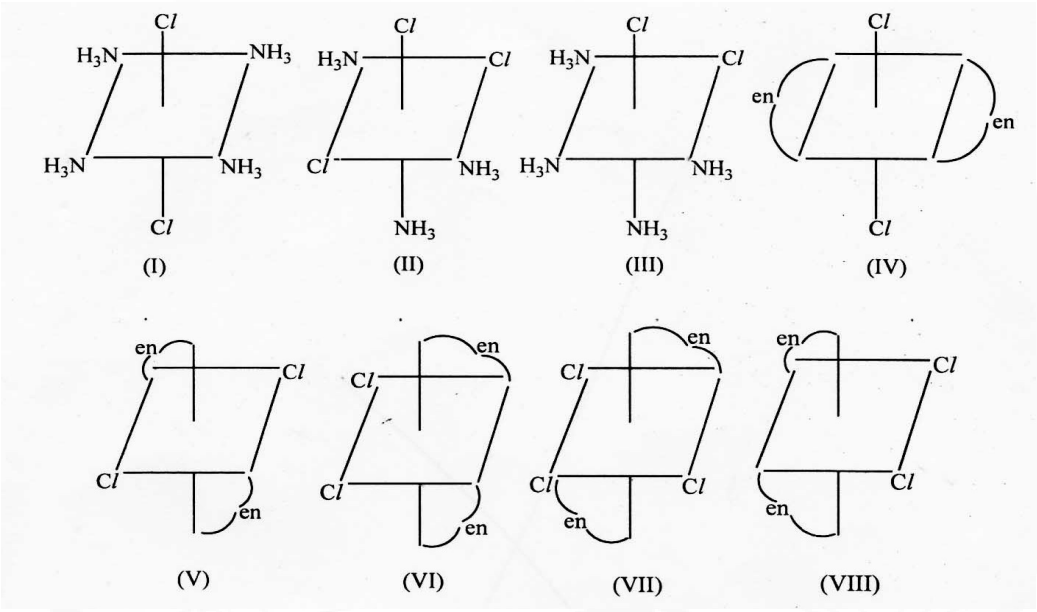
3) $\left[Co(Pn)(NH_3)_4\right]^{3+}$ can show ligand isomerism (Pn is prop-1,2-diammine)

4) $\left[Co(en)_3\right]\left[Cr(ox)_3\right]$ shows linkage isomerism

24. If $\Delta_0 < P$ the correct electronic configuration for d^4 system will be (Δ_0 = crystal field splitting separation energy, P = pairing energy)

1) $t_{2g}^4 e_g^0$ 2) $t_{2g}^3 e_g^1$ 3) $t_{2g}^0 e_g^4$ 4) $t_{2g}^2 e_g^2$

25. Consider the molecular structures



Choose the incorrect statement(s)

1) I and III are geometrical isomers 2) VI and VIII are identical structure

3) IV and VIII are geometrical isomers 4) VI and VIII are optical isomers

26. When aqueous solution Containing CrO_4^{2-} and $Cr_2O_7^{2-}$ is treated with $(CH_3COO)_2 Pb$ solution yellow precipitate is formed, It is due to

1) $PbCr_2O_7$ only 2) $PbCrO_4$ only 3) both $PbCr_2O_7$ & $PbCrO_4$ 4) PbS

27. Which of the following gives red colour vapours during chromyl chloride test?

1) AgCl 2) $HgCl_2$ 3) $SnCl_2$ 4) NaCl

28. $Mn^{2+} + S_2O_8^{2-} + H_2O \rightarrow X(oxo\ anion\ contains\ Mn)$

$KX \xrightarrow{513K} K_2Y + Z + O_2$ (Where Y is oxo anion containing Mn)

Find oxidation state of Mn in Z.

1) +2 2) + 6 3) + 7 4) +4

29. Correct statement's is/are

1) $[CuCl_4]^{2-}$ ion may exists in both tetrahedral & squareplanar structures

2) 1,3 pentadiene + hydrogen gas $\xrightarrow[at\ room\ temperature\ and\ pressure]{In\ the\ presence\ of\ wilkinsons\ catalyst}$ 2-pentene

3) In water , $2Cu^{+} \rightleftharpoons Cu^{+2}Cu$, by adding SCN^{-} to this equilibrium backward reaction is favoured

4) all the above

30. The EAN of each Mn in $\left[Mn_2(CO)_{10}\right]$

1) 35 2) 36 3) 70 4)72