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M.Sc. Semester-III (Chemistry) (Old Course)
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કુલ સમયઃ– : ૬૦ મીનીટ **કુલ પ્રશ્નો : ૫૦** **વિદ્યાર્થીએ ટીક કરવાના પ્રશ્નો : ૩૫**

નોંધ : વિદ્યાર્થીએ માત્ર ૩૫ પ્રશ્નો જ ટીક કરવાના રહેશે. જો વધારે ટીક કરેલ હશે તો પ્રથમ ૩૫ પ્રશ્નો જ ગણતરીમાં લેવામાં આવશે.

1. The complex ions $[CO(NH_3)_5(NO_2)]^{+2}$and $[CO(NH_3)_5 (ONO)]^{+2}$are called
   (a) Ionization isomers (b) Geometrical isomers (c) Co-ordination isomers (d) Linkage isomers
2. Which of the following has square planar structure?
   (a)) $[Ni(CN)_4]^{2-}$ (b) $[Ni(CO)_4]$ (c) $[NiCl_4]^{2-}$ (d) all of above
3. What is Mohr's salt?
   (a) $Fe_2(SO_4)$ 3 . $(NH_4)_2SO_4$.$6H_2O$ (b) $MgSO_4$. $7H_2O$ (c) $FeSO_4$. $(NH_4)_2$ .SO_4 . $6H_2O$ (d) $FeSO_4$. $7H_2O$
4. Primary and secondary valency of Pt in $[Pt(en)_2Cl_2]$ are
   (a) 4, 4 (b) 2, 6 (c) 6, 4 (d) 4, 6
5. What is IUPAC name of $[Pt(NH_3)_3$ Br (NO_2) Cl]cl is
   (a) triamminebromidochloridonitroplatinum (IV) chloride (b) triamminechloridobromidonitrochloride- platinum (IV) chloride
   (c) triamminechlorodibromidoplatinum (IV) chloride (d) triamminenitrochlorobromoplatinum (IV) chloride
6. Which of the following shall form an octahedral complex?
   (a) d^4 (low spin) (b) d^6 (low spin) (c) d^8 (high spin) (d) All of these
7. EDTA is used for the estimation of
   (a) Na^+ and K^+ ions (b) Ca^{+2} and Mg^{2+} ions (c) Cu^{+2} and Cs^+ ions (d) Ca^{+2} and Br^- ions
8. What is limitation of VBT theory?
   (a) VBT theory explain the structure of complex (b) VBT theory does not explain magnetic property of complex
   (c) VBT theory explain low spin and high spin complex (d) VBT theory explain CN,CO ,NO_2 ,NH_3 follows Hund's principle.
9. The more stable complex among the following.
   (a) $[Fe(H_2O)_6]^{+3}$ (b) $[Mn(H_2O)_6]^{+2}$ (c) $[Fe(H_2O)_6]^{+2}$ (d) all of above
10. Which of following ligands do not follow Hund's rule?
    (a) H_2O>$^-$OH>F^->S^{-2}>Cl^- (b) F^->Cl^->Br^->I^- (c) NCS^->H_2O>$C_2O_4^{-2}$>$^-$OH (d) CO>CN^->NO_2^->en>NH_3
11. Ground state of V^{+3} is
    (a) $^1G_4$ (b) $^3F_3$ (c) $^3F_2$ (d) $^3F_1$
12. The lowest energy transition for d^2 ion is
    (a) $^3T_{1g}(F)^3 \longrightarrow A_{2g}(F)$ (b) $^3T_{1g}(F)^3 \longrightarrow T_{2g}(F)$
    (c) $^3T_{1g}(F)^3 \longrightarrow T_{1g}(F)$ (d) All of above
13. Ground state has:
    (a) Lowest multiplicity (c) Highest multiplicity (c) A and b (d) None of above
14. Energy difference between $^3T_{1g}(F) \longrightarrow {}^3T_{2g}(F)$ is:
    (a) 18 Dq (b) 6 Dq+15 B (c) 8 Dq (d) All of above
15. Energy difference between F and P is
    (a) 20B (b) 15B (c) 18B (d) 12B
16. Spin-forbidden transitions band are
    (a) Sharp (b) Broad (c) Weak (d) A and B
17. Charge transfer bands generally are:
    (a) Weak (b) Broad (c) Intense (d) All of above
18. Lowest energy transition for d^8 ion is:
    (a) $^3A_{2g}(F)^3 \longrightarrow T_{2g}(P)$ (b) $^3A_{2g}(F)^3 \longrightarrow T_{2g}(F)$
    (c) $^3A_{2g}(F)^3 \longrightarrow T_{1g}(F)$ (d) None of these
19. In Tanabe-Sugano diagrams, the abscissa represents:
    (a) Excited state (b) Ground state (d) A and B (d) None of above
20. Allowed transition, according to spin selection rule is:
    (a) $^3P \longrightarrow {}^3P$ (b) $^3T_{1g}{}^3 \longrightarrow T_{2g}$ (c) $^3P \longrightarrow {}^1S$ (d) $^3T_{1g}{}^1 \longrightarrow T_{1g}$
21. d-d transition is
    (a) Ligand-ligand transition (b) Ligand-Metal transition (c) Metal-Metal transition (d) Metal -ligand transition
22. d-d transition is not observed in complex:
    (a) $[Ti(H_2O)_6]^{+3}$ (b) $[Cu(NH_3)_4]^{+2}$ (c) CrO_4^{-2} (d) All of above
23. Which of the compound shows charge transfer transition in the visible region?
    (a) HgI_2 (b) $Th(C_2O_4)$ (c) Zns (d) All of above
24. In which complex, John-Tailler distortion is possible?
    (a) $[Cr(H_2O)_6]^{+3}$ (b) $[Cu(H_2O)_6]^{+2}$ (c) $K_4[Fe(CN)_6]$ (d) All of above
25. Tanabe-Sugano diagrams are
    (a) Help in filling the value of Δ_0 (b) It helps for interpreting electronic spetra
    (c) Have only qualitative importance (d) All of above

26. Which ion hole is equivalent to d^2 ion?
    (a) d^1 (b) d^4 (c) d^5 (d) d^8
27. for diamagnetic substance:
    (a) P>1 (b) P<1 (c) P=1 (d) P=0
28. For ferromagnetic substance value of θ is
    (a) Positive (b) Negative (c) Both A and B (d) None of above
29. For octahedral copper(II),value of λ *is*:
    (a) Positive (b) Negative (c) Not negative Nor Positive (d) None of above
30. Cross over region for d^4 ion is
    (a) 2.7Dq/B (b) 2.0Dq/B (c) 2.2Dq/B (d) 2.8Dq/B
31. value of depends upon:
    (a) Oxidation state of metal (b) Principal quantum number (c) Nature of ligands (d) All of above
32. Ni(II) in octahedral filed show:
    (a) No orbital contribution (b) Can't say (c) Orbital contribution (d) None of a and b
33. In t_2g^3 octahedral filed show
    (a) Yes (b) No (c) Both (d) none
34. $Fe_3O_4$is :
    (a) Ferri magnetic (b) Antiferro magnetic (c) Diamagnetic (d) Paramagnetic
35. Zinc is:
    (a) Paramagnetic (b) Diamagnetic (c) Ferromagnetic (d) Antiferromagnetic
36. The diamagnetic nature of four coordinated NI(II) complexes have geometry:
    (a) Square planar (b) Tetrahedral (c) Octahedral (d) None of these
37. The coordination number of Cr in $(Cr(NH_3)_3(H_2O)_3]Cl_3$
    (a) 2 (b) 3 (c) 4 (d) 6
38. Which type of $Fe(H_2O)_6$Complex?
    (a) Hetroleptic (b) Anionic (c) Cationic (d) Neutral
39. Ligands in complex compounds
    (a) Accept e pair (b) Donate e pair (c) Neither Accept e pair nor Donate e pair (d) All of above
40. Which of the following compounds donot follow EAN rule?
    (a) $[Fe(CN)_6]^{-3}$ (b) $[Fe(CN)_6]^{-4}$ (c) $Ni(CO)_4$ (d) $[Cu(NH_3)_4]^{+3}$
41. The magnetic moment (spin only) of $NiCl_4^{-2}$ is
    (a) 5.46BM (b) 2.83BM (c) 1.41 BM (d) 1.82 BM
42. Which of following complexes in an inner orbital complex?
    (a) $[CoF_6]^{-3}$ (b) $[FeF_6]^{-3}$ (c) $[Co(NH_3)_6]^{+3}$ (d) $[Co(H_2O)_6]^{+3}$
43. Cis platin is compounds use for
    (a) Malaria (b) Fever (c) AIDS (d) Cancer
44. Complexometric titration involve use
    (a) EDTA (b) $K_2Cr_2O_7$ (c) $KmNO_4$ (d) All of above
45. Which of following represents chelating Ligand?
    (a) H_2O (b) ^-OH (c) OX (d) Cl^-
46. Colour of coordination compound is
    (a) s-p (b) p-p (c) d-d (d) p-d
47. Electronic Spectrum in d^5 ion are
    (a) Laparte's forbidden (b) Spin forbidden (c) Both (d) None of these
48. Electronic spectrum of $[Fe(H_2O)_6]^{+2}$ shows shoulder at 8300 cm^{-1} due to:
    (a) Faraday effect (b) John-teller effect (c) Cotton effect (d) All of above
49. No of absorption peak for d^9 ion
    (a) 1 (b) 2 (c) 4 (d) 5
50. Which of the following metal ions has the highest paramagentism?
    (a) $[Cr(H_2O)_6]^{+3}$ (b) $[Cu(H_2O)_6]^{+2}$ (c) $[Fe(H_2O)_6]^{+2}$ (d) $[Zn(H_2O)_4]^{+2}$