CHEMISTRY

61. When H_2O_2 is added to ice cold solution of acidified potassium dichromate containing ether, the contents are shaken and allowed to stand

1) CrO_3 is formed which dissolves in ether to give blue colour

2) Blue CrO_2Cl_2 is formed

3) a blue colour is obtained in ether due to formation of $CrO(O_2)_2$

4) a green colour is obtained in ether due to formation of CrO_5

62. The *correct* statement among the following is

1) The first ionization enthalpy of Na is more than the first ionization enthalpy of Mg

2) The third ionization enthalpy of Mg is less than the third ionization enthalpy of Al

3) The second ionization enthalpy of Mg is less than the second ionization enthalpy of Na

4) The first ionization enthalpy of Al is more than the first ionization enthalpy of Mg

63. Which one of the following is incorrect?

1) $O_2^+ > O_2 > O_2^- > O_2^{2-}$:(Bond order) 2) $CN^+ < CN^- < CN$:(Bond length)

3) $N_2 > C_2 > B_2$:(Bond order) 4) $NO^+ < NO < NO^-$:(Bond length)

64. Which combination cannot be used for the preparation of hydrogen gas?

1) Zn + Conc H_2SO_4 2) Zn + aqueous alkali

3) $NaH + H_2O$ 4) Granulated Zn + dilute H_2SO_4

65. The electronic configuration of the element which is just above the element with atomic number 43 in the same group is

1) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^7 4s^2$ 2) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 4s^2$

3) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^2$ 4) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^1 4p^6$

66. Among NO_2^+, BaO_2, KO_2 and AlO_2^-, unpaired electrons are not present in

1) NO_2^+ only 2) KO_2 only

3) BaO_2, NO_2^+ only 4) BaO_2, NO_2^+, AlO_2^-

67. In Group 6 of the periodic table which metal produces MH type of hydride?

1) both Mo and W 2) only Cr

3) only Mo 4) all Cr,Mo,W

68. The *correct* order of second ionization enthalpy of C,N,O and F is:

1) $O > N > C > F$ 2) $F > O > N > C$ 3) $C > N > O > F$ 4) $O > F > N > C$

69. The *incorrect* statement(s) regarding, $(A)HClO$ $(B)HClO_2$ $(C)HClO_3$ $(D)HClO_4$ is(are)

I. The number of $Cl = O$ bonds in (B) and (C) together is two

II. The number of lone pairs of electrons on Cl in (B) and (C) together is three

III. The hybridization of Cl in (D) is sp^3

IV. Amongst (A) to (D), the strongest acid is (A)

1) I and II 2) I and IV 3) II and III 4) only IV

70. The oxide that gives H_2O_2 on treatment with dilute H_2SO_4 is

1) PbO_2 2) TiO_2 3) MnO_2 4) $BaO_2.8H_2O$

71. The IUPAC symbol for an element is given by Uuo. Select correct statement about the element

1) It belongs to 17^{th} group 2) It is a chalcogen

3) It belongs to 7^{th} period 4) It belongs to 6^{th} period

72. Hydrogen peroxide acts both as an oxidizing agent and as a reducing agent depending upon the nature of the reacting species. In which of the following cases H_2O_2 acts as a reducing agent in acid medium?

1) $\left[Fe(CN)_6\right]^{3-}$ 2) MnO_4^- 3) KI 4) SO_3^{2-}

73. Which of the following compounds is used for water softening?

1) Na_2HPO_4 2) Na_3PO_4 3) $Ca_3(PO_4)_2$ 4) $Na_6P_6O_{18}$

74. Which one of the following statements is incorrect in relation to ionization enthalpy?

1) End of valence electrons is marked by a big jump in ionization enthalpy

2) The greatest increase in ionization enthalpy is experienced on removal of electron from core noble gas configuration

3) Removal of electron from orbitals bearing lower 'n' value is easier than from orbital having higher 'n' value

4) Ionization enthalpy increases for each successive electron

75. Which of the alkaline earth metal halides given below is essentially covalent in nature?

1) $SrCl_2$ 2) $BeCl_2$ 3) $CaCl_2$ 4) $MgCl_2$

76. The order of bond dissociation enthalpy(BDE) of H_2 and D_2 is:

1) $H_2 = D_2$ 2) BDE of H_2 = $3\times$ BDE of D_2

3) $H_2 < D_2$ 4) BDE of H_2 = $2\times$ BDE of D_2

77. Which one of the following elements will have positive electron gain enthalpy value?

1) Be 2) O 3) P 4) S

78. For which one of the following compounds its dipole moment is *not* equal to zero?

1) PCl_3F_2 2) $P(CH_3)_3F_2$ 3) ICl_2^- 4) PCl_2F_3

79. Polyphosphates are used as water softening agents because they

1) precipitate cationic species

2) precipitate anionic species

3) form soluble complexes with anionic species

4) form soluble complexes with cationic species

80. Consider:

I: $O^{+}_{(g)} \rightarrow O^{2+}_{(g)}$ II: $O^{-}_{(g)} \rightarrow O^{2-}_{(g)}$ III: $O_{(g)} \rightarrow O^{-}_{(g)}$ IV: $O_{(g)} \rightarrow O^{2-}_{(g)}$

Which one of the given conversions are endothermic $(\Delta H = +ve)$?

1) Only I 2) only I and II

3) only I,II and IV 4) only II and IV

81. Which one of the following molecular orbital has zero nodes or nodal planes?

1) σ_{1s-1s} 2) σ^{*}_{1s-1s} 3) $\pi^{*}_{2p_y-2p_y}$ 4) $\sigma^{*}_{2p_x-2p_x}$

82. I. Salts like NaCl are more soluble in heavy water than water

II. NaH reacts with water and liberated oxygen gas

III. Terrestrial hydrogen contains 0.0156% of deuterium mostly in the form of HD

IV. At atmospheric pressure ice crystallizes in the hexagonal form

Then the *correct* statement(s) is/are:

1) only I and II 2) only III and IV

3) only IV 4) only II and IV

83. Which of the following statements is correct?

1) $NH_3 < PH_3 < AsH_3 < SbH_3 < BiH_3$: increasing order of bond angles

2) Molecules IOF_5 and XeO_2F_4 have similar shape but have different number of lone pairs in whole molecules

3) Both $CHCl_3$ and SF_4 molecules have regular geometry

4) $CH_4 < NH_3 < NF_3 < H_2O$: increasing order of dipole moment

84. The hybridization of the central atom will change when

1) H_3BO_3 combines with OH^- 2) H_2O combines with H^+

3) NH_3 combines with H^+ 4) NH_3 forms NH_2^-

85. $\text{Methane} + \text{steam} \xrightarrow[\text{Ni}]{1270\text{K}} \text{mixture of gases}(X) \text{ -------(1)}$

$\text{One of the gas in X} \xrightarrow[\text{catalyst(Z)}]{\text{steam, 673K}} \text{mixture of gases}(Y) \text{ -------(2)}$

Then identify the *correct* statements regarding reactions (1) and (2)

I. X is called syn gas

II. Reaction(2) is called water gas shift reaction

III. Z is V_2O_5

IV. In Y, one of the gas is removed by scrubbing with sodium arsenite solution

1) only II and III 2) only I,II and IV

3) only I and II 4) I,II,III and IV

86. Which one of the following is relatively more covalent?

1) MnO 2) Mn_2O_7 3) MnO_2 4) Mn_2O_7

87. The species having no $p\pi - p\pi$ bond but has bond order equal to that of O_2?

1) PO_4^{3-} 2) XeO_3 3) ClO_3^- 4) SO_4^{2-}

88. Which one of the following is *incorrect*?

1) H_2O is oxidized to O_2 with fluorine

2) Water is oxidized to O_2 during photosynthesis

3) H_2O_2 is miscible with water in all proportions and forms a hydrate $H_2O_2.H_2O$

4) In the solid phase structure of H_2O_2 at 110K, dihedral angle is 111.5^0

89. In the long form of the periodic table, the valence shell electronic configuration of $5s^2 5p^4$ corresponds to the element present in

1) Group 17 and period 5 2) Group 16 and period 5

3) Group 17 and period 6 4) Group 16 and period 6

90. *Incorrect* order of decreasing boiling points is

1) $CH_4 > GeH_4 > SiH_4$ 2) $H_2O > H_2Te > H_2Se > H_2S$

3) $HF > HI > HBr > HCl$ 4) $NH_3 > AsH_3 > PH_3$