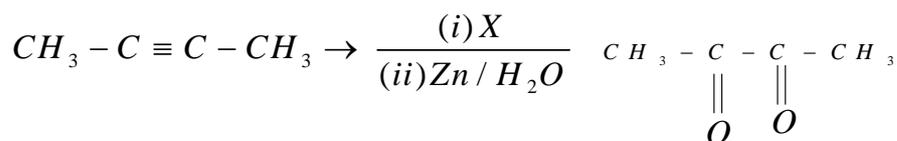


**CHEMISTRY**

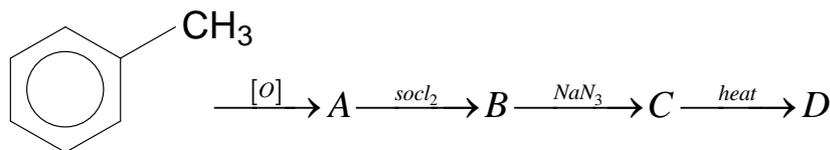
46. The solubility product of a salt having general formula  $MX_2$ , in water is  $4 \times 10^{-12}$ . The Concentration of  $M^{2+}$  ions in the aqueous solution of the salt is  
 1)  $4 \times 10^{-1} M$                       2)  $1.6 \times 10^{-4} M$                       3)  $1 \times 10^{-4} M$                       4)  $2 \times 10^{-6} M$
47. The Bond order in NO is 2.5. While that in  $NO^+$  is 3. Which of the statements is true for these two species?  
 1) Bond length in  $NO^+$  is greater than in NO  
 2) Bond length in NO is greater than in  $NO^+$   
 3) Bond length in  $NO^+$  is equal to that in NO  
 4) Bond length is unpredictable
48. Density of equilibrium mixture of  $N_2O_4$  and  $NO_2$  at 1 atm and 384 K is  $1.84 \text{ gdm}^{-3}$ . Calculate the equilibrium constant of the reaction  $N_2O_4 \rightleftharpoons 2NO_2$   
 1) 2.09 atm                      2) 9.02 atm                      3) 3.6 atm                      4) 6.3 atm
49.  $\Delta H$  and  $\Delta S$  for the reaction  $Br_2(l) + Cl_2(g) \rightarrow 2BrCl(g)$  are 29.37 KJ and  $104 \text{ Jk}^{-1}$  respectively. Above what temperature will this reaction become spontaneous?  
 1) Above 150K                      2) above 282.4K                      3) above 153.5K                      4) above 263.4K
50. The correct order of magnetic moments (spin only values in BM) among the following is  
 1)  $[MnCl_4]^{2-} > [CoCl_4]^{2-} > [Fe(CN)_6]^{4-}$                       2)  $[MnCl_4]^{2-} > [Fe(CN)_6]^{4-} > [CoCl_4]^{2-}$   
 3)  $[Fe(CN)_6]^{4-} > [MnCl_4]^{2-} > [CoCl_4]^{2-}$                       4)  $[Fe(CN)_6]^{4-} > [CoCl_4]^{2-} > [MnCl_4]^{2-}$

51.

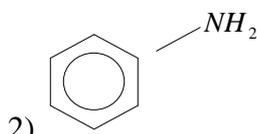


in the above reaction X is

- 1)  $HNO_3$                       2)  $O_2$                       3)  $O_3$                       4)  $KMnO_4$
52. What mass of  $Mg(OH)_2$  is required to neutralize 125ml of 0.136 M  $HCl$  solution?  
 1) 0.248 g                      2) 0.992g                      3) 1.98 g                      4) 0.496g
53. In the following sequence of reactions, what is D

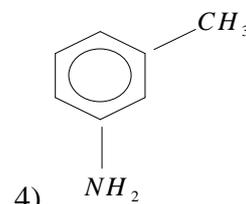


1) Primary Amine



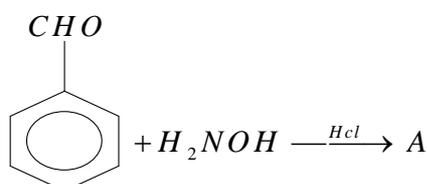
2)

3) Phenyl isocyanate



4)

54.



How many isomeric forms does the compound A exist?

1) 3

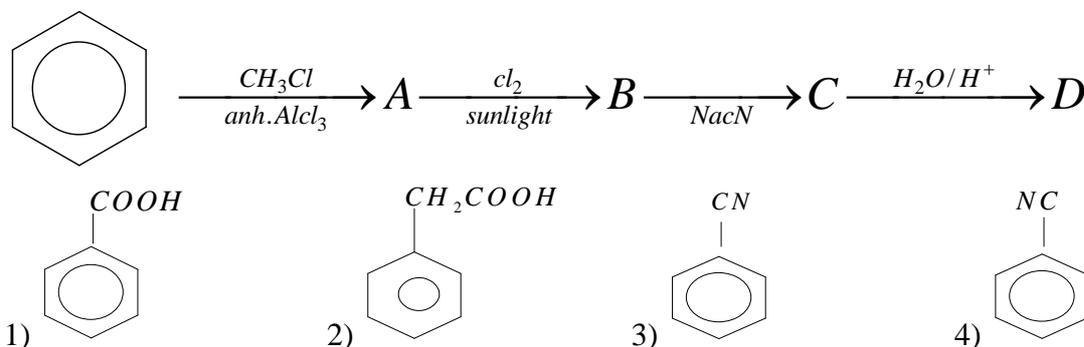
2) 4

3) 2

4) 1

55. If uncertainty in the position of electron is  $0.9 \text{ \AA}^0$ . The uncertainty in it's velocity is  
 1)  $5.8 \times 10^{10} \text{ cm/sec}$     2)  $5.8 \times 10^8 \text{ cm/sec}$     3)  $6.4 \times 10^7 \text{ cm/sec}$     4)  $0.64 \times 10^7 \text{ cm/sec}$
56.  $(\text{CH}_3)_2\text{CO} \xrightarrow[\text{HCl}]{\text{NaCN}} \text{X} \xrightarrow[\Delta]{\text{H}_3\text{O}^+} \text{Y}$ .  
 In the above sequence of reactions X and Y are  
 1)  $(\text{CH}_3)_2\text{C}(\text{OH})\text{CN}$ ,  $(\text{CH}_3)_2\text{C}(\text{OH})\text{COOH}$   
 2)  $(\text{CH}_3)_2\text{C}(\text{OH})\text{CN}$ ,  $(\text{CH}_3)_2\text{C}(\text{OH})_2$   
 3)  $(\text{CH}_3)_2\text{C}(\text{OH})\text{CN}$ ,  $(\text{CH}_3)_2\text{CHCOOH}$   
 4)  $(\text{CH}_3)_2\text{C}(\text{OH})\text{CN}$ ,  $(\text{CH}_3)_2\text{C}=\text{O}$
57. The time requires to coat a metal surface of  $80 \text{ cm}^2$  with  $5 \times 10^{-3} \text{ cm}$  Thick layer of silver (density  $1.05 \text{ g/cm}^3$ ) by passing a current of 3 amp through  $\text{AgNO}_3$  solution is  
 1) 115 sec    2) 125 sec    3) 135 sec    4) 145 sec
58. Biodegradable polymer which can be produced from glycine and aminocaproic acid is  
 1) Buna -N    2) Nylon 6,6    3) nylon 2- nylon6    4) PHBV
59. Which of the following compounds is an anti fertility drug?  
 1) Aspirin    2) Penicillin    3) Chloromycetin    4) norethindrone
60.  $\text{X} \xleftarrow{\text{HI}} \text{Glu cose} \xrightarrow{\text{HNO}_3} \text{Y}$ . what are X and Y?  
 1) n- Hexane and gluconic acid    2) Gluconic acid and saccharic acid  
 3) n- Hexanol and saccharic acid    4) n- hexane and saccharic acid
61.  $\text{CH}_3 - \text{CH}_2 - \text{OH} \xrightarrow{\text{PCC}} \text{A} \xrightarrow{\text{NaOH}} \text{B}$ . Then 'B' is  
 1)  $\text{CH}_2 = \text{CH}_2$     2)  $\text{CH}_3\text{CHO}$   
 3)  $\text{CH}_3 - \text{COOH}$     4)  $\text{CH}_3 - \underset{\text{OH}}{\text{CH}} - \text{CH}_2 - \text{CHO}$

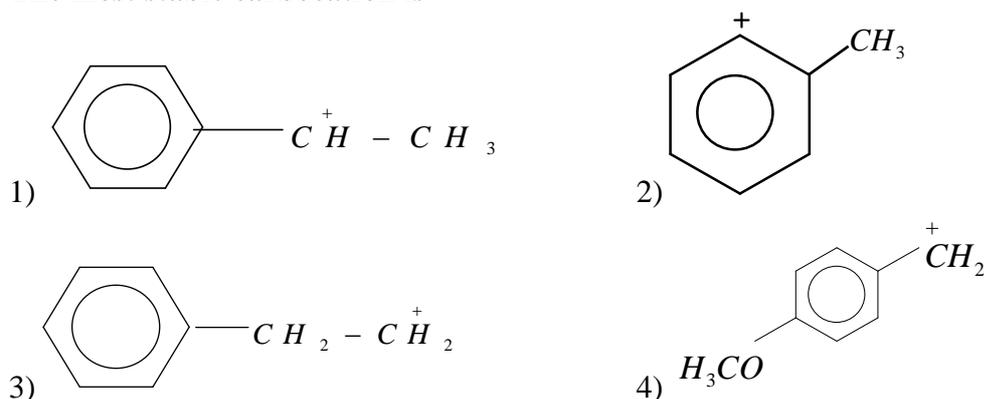
62.



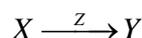
63. Which of the following order is true regarding the acidic nature of phenol?  
 1) Phenol > O - cresol > O - Nitro phenol    2) Phenol > O - cresol < O - Nitro phenol  
 3) Phenol < O - cresol < O - Nitro phenol    4) Phenol < O - cresol > O - Nitro phenol
64. In the following reaction. X and Y respectively are  
 $\text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{KMnO}_4/\text{H}^+} \text{X} \xrightarrow[\text{H}_2\text{SO}_4/\Delta]{\text{Y}} \text{CH}_3\text{COOC}_2\text{H}_5$   
 1)  $\text{CH}_3\text{OH}$ ,  $\text{C}_2\text{H}_5\text{OH}$     2)  $\text{CH}_3\text{CHO}$ ,  $\text{CH}_3\text{OH}$   
 3)  $\text{CH}_2=\text{CH}_2$ ,  $\text{CH}_3-\text{COOH}$     4)  $\text{CH}_3\text{COOH}$ ,  $\text{C}_2\text{H}_5\text{OH}$
65.  $\text{C}_2\text{H}_5\text{Cl} \xrightarrow{\text{aqKOH}} \text{A} \xrightarrow{\text{Na}} \text{B} \xrightarrow{\text{C}_2\text{H}_5\text{Cl}} \text{C}$  identify C in the above reaction  
 1)  $\text{C}_2\text{H}_5\text{ONa}$     2)  $\text{C}_2\text{H}_5\text{OH}$     3)  $\text{C}_2\text{H}_5-\text{O}-\text{C}_2\text{H}_5$     4)  $\text{C}_4\text{H}_{10}$
66. A fuel cell involves combustion of the butane at 1 atm and 298 K  
 $\text{C}_4\text{H}_{10(g)} + \frac{13}{2}\text{O}_{2(g)} \rightarrow 4\text{CO}_{2(g)} + 5\text{H}_2\text{O}(l)$ ,  $\Delta G^0 = -2746 \text{ KJ/mol}$   
 What is  $E^0$  of the cell?  
 1) +4.74V    2) +0.547V    3) +1.09V    4) +4.37V

67. For which of the following, the units of rate constant and rate of reaction of same  
 1) Zero order                      2) First order                      3) second order                      4) Third order
68. The density of an ideal gas is  $0.03 \text{ g/cm}^3$ , its pressure is  $10^6 \text{ dy/cm}^2$ . What is its R.M.S velocity in (Cm/s)  
 1)  $10^8$                       2)  $3 \times 10^4$                       3)  $1 \times 10^6$                       4)  $1 \times 10^4$
69. 100 g of lime stone on heating produced 22g of  $\text{CO}_2$ . The percentage of  $\text{CaCO}_3$  in lime stone is  
 1) 80%                      2) 60%                      3) 50%                      4) 87.66%
70. For the reaction  $2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}(\text{g})$ ;  $\Delta H = -571 \text{ KJ}$  bond energy of (H-H) is 435 KJ and (O=O) is 498 KJ. Then calculate the average bond energy of (O-H) bond using the above data  
 1) 484 KJ                      2) 884 KJ                      3) 271 KJ                      4) 279 KJ
71. The correct order of electrical conductivity of alkali metal ions in aqueous solution is  
 1)  $\text{Li}^+ > \text{Na}^+ > \text{K}^+ > \text{Rb}^+ > \text{Cs}^+$                       2)  $\text{Li}^+ < \text{Na}^+ < \text{K}^+ < \text{Rb}^+ < \text{Cs}^+$   
 3)  $\text{Li}^+ > \text{Na}^+ < \text{K}^+ < \text{Rb}^+ < \text{Cs}^+$                       4)  $\text{Li}^+ < \text{Na}^+ > \text{K}^+ > \text{Rb}^+ > \text{Cs}^+$
72. Which of the following statement is correct  
 1) Atomic radius of Na is greater than that of Mg.  
 2) Metallic bond in Mg is stronger than the metallic bond in Na  
 3) Melting and boiling points of Mg are greater than that of Ca  
 4) Mg and Ca are most abundant elements among the alkaline earth metals  
 The correct statements are  
 1) III, IV                      2) I, II, IV                      3) II, IV                      4) I, IV
73. Bond length of H-I is  $1.6 \text{ \AA}$  and its observed dipole moment is  $0.38 \text{ D}$ . Then the percentage of ionic character nearly  
 1) 5                      2) 8                      3) 10                      4) 15
74. The ionic radii (in  $\text{A}^0$ ) of  $\text{N}^{3-}$ ,  $\text{O}^{2-}$  and  $\text{F}^-$  are respectively  
 1) 1.36, 1.4 and 1.71                      2) 1.36, 1.71 and 1.4  
 3) 1.71, 1.4 and 1.36                      4) 1.71, 1.36 and 1.4
75. The method of Zone refining of metals is based on the principle of  
 1) Greater mobility of the pure metal than that of impurity  
 2) Higher melting point of the impurity than that of the pure metal  
 3) Greater conductivity of solid metal than that of impurity  
 4) Greater solubility of the impurity in the molten state than in solid state of metal
76. EAN (effective atomic number) are not equal in which of the following pair  
 1)  $[\text{Ni}(\text{CO})_4]$ ,  $[\text{Fe}(\text{CN})_6]^{4-}$                       2)  $[\text{Ni}(\text{en})_2]$ ,  $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$   
 3)  $[\text{Co}(\text{CN})_6]^{3-}$ ,  $[\text{Fe}(\text{CN})_6]^{4-}$                       4)  $[\text{Ni}(\text{en})_2]$ ,  $[\text{Cu}(\text{CN})_4]^{2-}$
77. Hexaquo titanium (111) chloride is represented as  
 1)  $[\text{Ti}(\text{H}_2\text{O})_6]\text{Cl}_3$                       2)  $[\text{TiCl}_3]6\text{H}_2\text{O}$                       3)  $[\text{Ti}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_2$                       4)  $[\text{Ti}(\text{H}_2\text{O})_3\text{Cl}_3]$
78. Which of the following electrolytes is most effective in the coagulation of gold solution?  
 1)  $\text{NaNO}_3$                       2)  $\text{K}_4[\text{Fe}(\text{CN})_6]$                       3)  $\text{Na}_3\text{PO}_4$                       4)  $\text{MgCl}_2$
79. A aqueous solution freezes at  $-1.86^\circ \text{C}$ , ( $K_f=1.86$ ,  $K_b=0.512$ ) what is the elevation in boiling point?  
 1) 0.186                      2) 0.512                      3) 0.86                      4) 0.0512
80. A metal crystallizes in a bcc lattice. Its unit cell edge length is about  $3 \text{ \AA}$  and its molar mass is about 60 g/mol. The density of the metal is  
 1) 7.4                      2) 6.2                      3) 9.3                      4) 12.4
81. The position of Br in the compound  $\text{CH}_3 - \text{CH} = \text{CHC}(\text{Br})(\text{CH}_3)_2$  is  
 1) Allyl                      2) Aryl                      3) Vinyl                      4) Secondary

82. The most stable carbocation is



83.  $CaC_2 + 2H_2O \rightarrow X$



In this reaction the reagent 'Z' is

- 1)  $Con\ H_2SO_4$       2)  $LiAlH_4$       3)  $Pd+BaSO_4$       4)  $(Zn-Hg)+\ ConHCl$

84.  $C_2H_6 \xrightarrow{(CH_3COO)_2Mn} X \xrightarrow{PCl_5} Y \xrightarrow[Anh.\ AlCl_3]{C_6H_6} Z$ . Identify X, Y, Z.

- 1)  $CO_2, COCl, C_6H_5COCl$       2)  $CH_3CHO, CH_3CH_2Cl, C_6H_5CH_2COCl$   
 3)  $CH_3COOH, CH_3COCl, C_6H_5COCH_3$       4)  $HCOOH, HCOCl, C_6H_5CHO$

85. In  $PO_4^{3-}$  ion the formal charge on each oxygen atom and P-O bond order respectively are

- 1) -0.75, 1.25      2) -3, 1.25      3) -0.75, 1      4) -0.75, 0.6

86. The statements regarding hydrides of VI-A group elements are

- i) The order of volatility  $H_2O < H_2Te < H_2Se < H_2S$   
 ii) The order of boiling point  $H_2O > H_2Te > H_2Se > H_2S$   
 iii) The order of bond angles  $H_2O > H_2S > H_2Se > H_2Te$

The correct combination is

- 1) Only (i) is correct      2) (ii) and (iii) are correct  
 3) (i) and (iii) are correct      4) All are correct

87. The halogen having greenish yellow gas reacts with hot and concentrated NaOH solution and give products. The oxidation state of that halogen changes from

- 1) 0 to -1      2) 0 to +5      3) -1 to +1      4) 0 to -1 and +5 states

88. The distribution of electrons in metal ion in  $[Mn(H_2O)_6]^{2+}$  in splitted d- orbitals is

- 1)  $t_{2g}^5 e_g^0$       2)  $t_{2g}^3 e_g^2$       3)  $t_{2g}^2 e_g^3$       4)  $t_{2g}^4 e_g^1$

89. Number of  $\sigma$  bonds present in meta borate ion and borazole are

- 1) 14, 15      2) 14, 12      3) 18, 12      4) 18, 15

90. Name of structure of silicate in which three oxygen atoms of  $[SiO_4]^{4-}$  are shared is

- 1) Pyro silicate      2) Sheet silicate  
 3) Linear chain silicate      4) Three dimensional silicate

### BIOLOGY

91. One of the following serve as quick referral systems in taxonomical studies.

- 1) Flora      2) Manuals      3) Herbaria      4) Monographs

92. Study the flow chart. Name the hormones labeled as A, B, C, D at each stage

Choose the correct option