CHEMISTRY **SET – A**

1. Which of the following processes will produce permanent hardness of water ?

   (A) Addition of sodium sulphate to water

   (B) Saturation of water with calcium sulphate

   (C) Saturation of water with magnesium carbonate

   (D) Saturation of water with calcium carbonate

2. Identify the incorrect statement among the following

   (A) Lanthanoids have greater tendency to form complexes than actinoids

   (B) 4*f* electrons in Lanthanoids have greater shielding effect than 5*f* electrons in actinoids

   (C) Lanthanoid compounds are less basic than actinoid compounds

   (D) Due to lanthanoid contraction, the atomic radii of second row of transition series are almost similar to those of the third row of transition series

3. Oxygen is more electronegative than sulphur, yet H_2S is slightly more acidic than H_2O. This is because

   (A) Water is highly associated compound

   (B) Molecular mass of H_2S is more than H_2O

   (C) H_2S is gas under ordinary conditions while H_2O is liquid

   (D) H - S bond is weaker than H - O bond

4. In Clemmensen reduction, the reducing agent used is

   (A) $LiAlH_4$ (B) H_2, Ni or Pd

   (C) Mg/Hg & H_2O (D) Zn/Hg, HCl

5. Pick out the most acidic hydrocarbon

(A) C_2H_2 (B) C_4H_8

(C) C_4H_6 (D) C_5H_{12}

6. Which of the following is a 2^0 haloalkane?

(A) 1-bromopropane (B) 2-bromopropane

(C) 2-bromo-2-methylpropane (D) None of these

7. Pick the odd one out from among the following on the basis of their medicinal properties

(A) Milk (B) Lansoprazole

(C) Hydrogen peroxide (D) Omeprazole

8. Which of the following contains same number of carbon atoms as are in 6.0g of carbon-12 ?

(A) 08.0g of methane (B) 06.0g of ethane

(C) 21.0g of propane (D) 28.0g of CO

9. The unit of rate constant of $\frac{3}{2}th$ order reaction is

(A) $mol^{1/2}L^{-1/2}s^{-1}$ (B) $mol^{-1/2}L^{1/2}s^{-1}$

(C) $mol^{-2}L^{2}s^{-1}$ (D) $molL^{-1}s^{-1}$

10. Which of the following statement is incorrect ?

(A) Aniline is a stronger base than ethyl amine

(B) pK_b value of aniline is higher than that of ethyl amine

(C) Aniline is a weaker base than ethyl amine

(D) Both aniline and ethyl amine have lone pair of electrons on N-atom

11. The E.M.F. of the cell $Ni \mid Ni^{2+}(1.0M) \| Au^{3+}(1.0M) \mid Au$

$[E^O \text{ for } Ni^{2+} \mid Ni = -0.25V \text{ \& } E^O \text{ for } Au^{3+} \mid Au = +1.50V]$ is given as

(A) $+1.75\ V$ (B) $-1.25\ V$

(C) $-1.75\ V$ (D) $+1.25\ V$

12. "The solubility of gas in a liquid at a particular temperature is directly proportional to the pressure of the gas in equilibrium with the solution". The statement is

(A) Dalton's law (B) Henry's law

(C) Raoult's law (D) Boyle's law

13. Which of the following represent the correct order of ionic radii ?

(A) $Ca^{2+} > K^+ > Cl^- > S^{2-}$ (B) $S^{2-} > Cl^- > K^+ > Ca^{2+}$

(C) $Cl^- > S^{2-} > K^+ > Ca^{2+}$ (D) $S^{2-} > Ca^{2+} > K^+ > Cl^-$

14. $[Co(NH_3)_4Cl_2]Cl$ exhibits

(A) Geometrical isomerism (B) Linkage isomerism

(C) Ionisation isomerism (D) Coordination isomerism

15. Which of the following will not evolve hydrogen gas?

(A) Iron and aqueous sulphuric acid (B) Copper and aqueous HCl

(C) Iron and steam (D) Sodium and ethanol

16. The property which serves as a criterion of purity of an organic compound is

(A) Solubility in water (B) Density

(C) Crystalline nature (D) Melting point

17. Which of the following orders correctly represents the increasing acid strength of the given acids ?

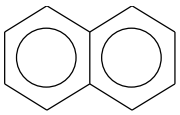
(A) $HOClO_3 < HOClO_2 < HOClO < HOCl$

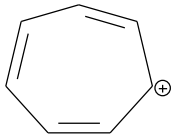
(B) $HOClO_2 < HOClO_3 < HOClO < HOCl$

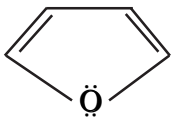
(C) $HOClO < HOCl < HOClO_3 < HOClO_2$

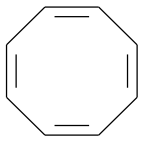
(D) $HOCl < HOClO < HOClO_2 < HOClO_3$

18. Which of the following is not an aromatic compound?

(A) 

(B) 

(C) 

(D) 

19. Which of these polymers have an amide linkage?

(A) Orlon (B) Synthetic rubber

(C) Nylon (D) Teflon

20. Silver mirror test is used to detect the presence of

(A) Carboxyl group (B) Ketonic group

(C) Aldehydic group (D) Nitro group

21. A real gas most closely approach the behaviour of an ideal gas at

(A) 15 *atm* & 200 K (B) 0.5 *atm* & 500 K

(C) 1 *atm* & 273 K (D) 15 *atm* & 500 K

22. The vapour pressure of two liquids 'A' and 'B' are 80 and 60 torr respectively. The total vapour pressure of solution obtained by mixing 3 moles of A and 2 moles of B would be

(A) 20 *torr* (B) 140 *torr*

(C) 68 *torr* (D) 72 *torr*

23. The conjugate base of HCO_3^- is

(A) H_2CO_3 (B) ^-OH

(C) CO_3^{2-} (D) H^-

24. For an adiabatic process, which of the following is correct ?

(A) $P\Delta V = 0$ (B) $q = +w$

(C) $q = 0$ (D) $\Delta U = q$

25. What is the coordination number of Cobalt in $[CoBr_2(en)_2]Cl$?

(A) 4 (B) 6

(C) 3 (D) 7

26. The plot of concentration of the reactant versus time for a reaction is a straight line with a negative slope. The reaction follows

(A) Zero order reaction (B) First order reaction

(C) Second order reaction (D) Half order reaction

27. 100g of calcium carbonate is treated with 49g of conc.H_2SO_4. What will be the volume of carbon dioxide liberated in litres after the completion of the reaction ?

(A) 05.5 (B) 06.5

(C) 11.2 (D) 12.2

28. What is not true about boron ?

(A) It is a typical metal

(B) It is a non metal

(C) Boron does not form B^{3+} ion

(D) It occurs in two isotopic forms

29. The structure of diborane contains

(A) Two 2c-2e bonds and two 3c-2e bonds

(B) Two 2c-2e bonds and four 3c-2e bonds

(C) Four 2c-2e bonds and four 3c-2e bonds

(D) Four 2c-2e bonds and two 3c-2e bonds

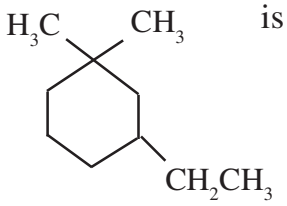
30. Which of the following is correct about lyophilic solutions ?

(A) They are irreversible

(B) They are formed by inorganic substances

(C) They are readily coagulated by addition of electrolytes

(D) They are self stabilised

31. The IUPAC name of the compound  is

(A) 3,3-Dimethyl-1-ethylcyclohexane

(B) 3-Ethyl-1,1-dimethylcyclohexane

(C) 1-Ethyl-3,3-dimethylcyclohexane

(D) 5-Ethyl-1,1-dimethylcyclohexane

32. Extraction of zinc from zinc blende is achieved by

(A) Electrolytic reduction

(B) Roasting followed by reduction with carbon

(C) Roasting followed by reduction with another metal

(D) Roasting followed by self reduction

33. The maximum permissible concentration of CO in the atmosphere is

(A) 0.01 ppm (B) 40 ppm

(C) 0.5 ppm (D) 0.1 ppm

34. The hybridisation of each carbon in $CH_3—C\equiv C—CHO$ is

(A) sp, sp^3, sp^2, sp (B) sp^3, sp, sp, sp

(C) sp^2, sp^3, sp^3, sp^2 (D) sp^3, sp, sp, sp^2

35. Haloalkanes do not undergo

(A) Electrophilic substitution reaction (B) Elimination reaction

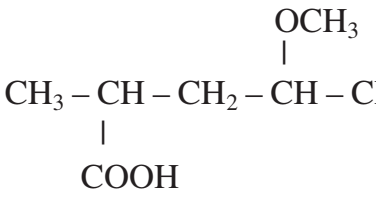
(C) Nucleophilic substitution reaction (D) Reduction

36. The chemical substances which are used to lower the temperature of the body in high fever are called

(A) Sulpha drugs (B) Antipyretics

(C) Antihistamines (D) Anesthetics

37. The IUPAC nomenclature of



is

(A) 2-methoxypentan-4-oic acid

(B) 4 - carboxy-2-methoxypentane

(C) 4-methoxy-2-methylpentanoic acid

(D) 1-methoxy-1-methylbutan-3-oic acid

38.  $+\frac{1}{2}O_2 \xrightarrow{\text{ether}} X \xrightarrow{H^+, H_2O} Y + Mg(OH)Br$. The compound Y is

(A) Bromobenzene (B) Cumene

(C) Phenol (D) Anisole

39. Ethylamine undergoes condensation to form Schiff base on reacting with

(A) Acetylchloride (B) Ammonia

(C) Acetone (D) Benzoic acid

40. Which of the following is diamagnetic ?

(A) O_2^+ (B) O_2

(C) O_2^- (D) O_2^{2-}

41. Of the following, which change will shift the reaction towards the product ?

$I_2(g) \rightleftharpoons 2I(g)$; $\Delta H_f^o(298K) = +150KJ$

(A) Increase in concentration of I (B) Increase in temperature

(C) Decrease in concentration of I_2 (D) Increase in total pressure

42. According to Bohr's theory, the angular momentum of electron in 4th orbit is

(A) $25.0\ \frac{h}{\pi}$ (B) $02.0\ \frac{h}{\pi}$

(C) $02.5\ \frac{h}{\pi}$ (D) $20.0\ \frac{h}{\pi}$

43. The limiting molar conductivity, Λ_m^o for NaCl, KBr and KCl are 126, 152 and 150 Scm^2mol^{-1} respectively. The Λ_m^o for NaBr is

(A) 278 Scm^2mol^{-1} (B) 128 Scm^2mol^{-1}

(C) 176 Scm^2mol^{-1} (D) 302 Scm^2mol^{-1}

44. Ammonia and oxygen reacts at high temperature as :

$4\ NH_3\ (g) + 5\ O_2\ (g) \longrightarrow 4\ NO\ (g) + 6\ H_2O\ (g)$

In an experiment, rate of formation of water is $5.4 \times 10^{-3} molL^{-1}s^{-1}$. What is the rate of disappearance of ammonia ?

(A) $8.1 \times 10^{-3} molL^{-1}s^{-1}$ (B) $1.35 \times 10^{-3} molL^{-1}s^{-1}$

(C) $3.6 \times 10^{-3} molL^{-1}s^{-1}$ (D) $5.4 \times 10^{-3} molL^{-1}s^{-1}$

45. Hybridisation in $[Fe(CN)_6]^{3-}$ is

(A) sp^3 (B) sp^3d

(C) sp^3d^2 (D) d^2sp^3

46. Which of the following sets of quantum numbers represents the highest energy of an electron in an atom ?

(A) n=3, l=2, m=1, s= +1/2 (B) n=3, l=1,m=1, s= +1/2

(C) n=4, l=0, m=0, s= +1/2 (D) n=3, l=0,m=0, s= +1/2

47. Which of the following statements is true for the electrochemical Daniel cell ?

(A) Electrons flows from copper electrode to zinc electrode

(B) Cation moves towards copper electrode

(C) Cation moves towards zinc electrode

(D) Current flows from zinc electrode to copper electrode

48. Solubilities of carbonates decreases down the magnesium group due to decrease in

(A) Entropy of solution formation (B) Lattice energy of solid

(C) Inter-ionic attraction (D) Hydration energy of cation

49. Which is the strongest Lewis acid ?

(A) BCl_3 (B) BF_3

(C) BI_3 (D) BBr_3

50. What is false about carbon ?

(A) It has crystalline as well as amorphous allotropes

(B) It can form $p\pi$ -$p\pi$ bond with other carbon atoms

(C) It cannot form $p\pi$ -$p\pi$ bond with atoms like N and O

(D) C-60 is also one of the allotropes of carbon

51. Which of the following barium salts is soluble in water ?

(A) Barium sulphate (B) Barium carbonate

(C) Barium nitrate (D) Barium phosphate

52. The high oxidising power of flourine is due to

(A) High electron affinity

(B) High heat of dissociation and low heat of hydration

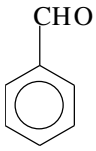
(C) High heat of hydration and low heat of dissociation

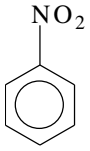
(D) High heat of dissociation and high heat of hydration

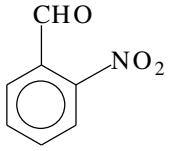
53. The shape of IF_5 is

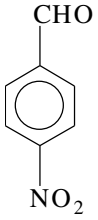
(A) Square pyramidal (B) Distorted octahedral

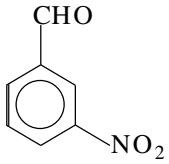
(C) Trigonal bipyramidal (D) Pentagonal

54.  $\xrightarrow{\text{Nitration}}$ **X** . The product **X** is

(A) 

(B) 

(C) 

(D) 

55. Chloroform on oxidation yields a poisonous substance called

(A) Chloroquine (B) Freons

(C) Phosgene (C) CO

56. Nylon - 6,6 is obtained by the reaction of hexamethylene diamine with

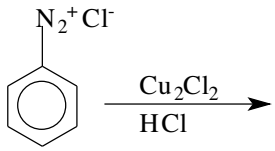
(A) Ethylene glycol (B) Adipic acid

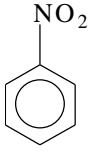
(C) Amino caproic acid (D) Tetrafluoro ethane

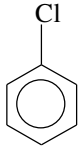
57. A vitamin which is neither soluble in water nor in fats is

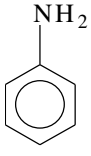
(A) Riboflavin (B) Biotin

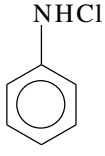
(C) Ascorbic acid (D) Retinol

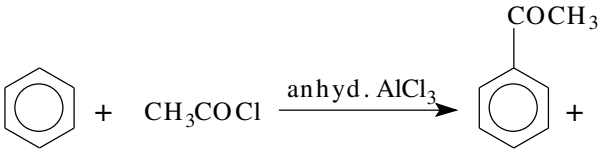
58. The reaction  yields

(A) 

(B) 

(C) 

(D) 

59.  . This reaction is

(A) Aldol condensation
(B) Friedel Craft's acylation
(C) Wolff- Kishner reduction
(D) Riemer-Tiemann reaction

60. The shape of BrO_3^- is

(A) Pyramidal
(B) Trigonal Planer
(C) Tetrahedral
(D) Trigonal bipyramidal

61. Molarity of 0.2 N Na_2CO_3 solution will be

(A) 0.05 M
(B) 0.2 M
(C) 0.1 M
(D) 0.4 M

62. At infinite dilution, when the dissolution is complete, each ion makes a definite contribution towards molar conductivity of the electrolyte, irrespective of the nature of other ions with which it is associated. This is the statement of

(A) First law of electrolysis
(B) Second law of electrolysis
(C) Kohlrausch's Law
(D) Ostwald's Law

63. The activation energy of a simple chemical reaction, $R \rightarrow P$, is E_a in forward direction. The activation energy for reversed reaction

(A) Is always less than E_a
(B) Is always more than E_a
(C) Can be more or less than E_a
(D) Is negative of E_a

64. The value of Azimuthal quantum number for all electrons present in 5p-orbitals is

(A) 4
(B) 5
(C) 2
(D) 1

65. Which statement is correct about the following change?

$$I_2 + 2S_2O_3^{2-} \rightarrow 2I^- + S_4O_6^{2-}$$

(A) Iodine gets oxidised to iodide ions
(B) Thiosulphate ion is oxidised
(C) Oxidation state of sulphur remains unaltered
(D) Oxidation state of sulphur changes from +1 to +2.5

66. Adsorption of gases on solid surface is generally exothermic because

(A) Enthalpy is positive (B) Entropy decreases

(C) Entropy increases (D) Free energy increases

67. In curing cement plasters, water is sprinkled from time to time. This helps in

(A) Converting sand into silicic acid

(B) Developing interlocking needle like crystals of hydrated silicates

(C) Hydrating sand and gravel mixed with cement

(D) Keeping it cool

68. How many chain isomers are possible for C_5H_{12} ?

(A) 3 (B) 2

(C) 4 (D) 6

69. Halogens are all coloured

(A) Due to absorption of ultra violet light

(B) Due to absorption of visible light

(C) Due to absorption of infra-red light

(D) None of the above

70. Which of the following is not a greenhouse gas ?

(A) Water vapour (B) Carbon dioxide

(C) Nitrogen (D) Ozone

71. The favourable conditions for a spontaneous process are

(A) $T\Delta S = \Delta H$, $\Delta H = -ve$, $\Delta S = -ve$

(B) $T\Delta S > \Delta H$, $\Delta H = +ve$, $\Delta S = -ve$

(C) $T\Delta S > \Delta H$, $\Delta H = +ve$, $\Delta S = +ve$

(D) $T\Delta S < \Delta H$, $\Delta H = +ve$, $\Delta S = +ve$

72. Specific conductivity of a solution

(A) Remains unchanged with dilution

(B) Decreases on dilution

(C) Increases with dilution

(D) Depends on mass of electrolyte

73. A compound formed by elements X and Y crystallises in a cubic structure in which X atoms are at the corners of a cube and Y atoms are at the face centres. The formula of the compound is

(A) XY_3 (B) X_3Y

(C) XY (D) XY_2

74. In the Modern Periodic table, the period indicates the value of

(A) Atomic number (B) Atomic mass

(C) Principal quantum number (D) Azimuthal quantum number

75. Which concept is used to explain the unexpected order of acidic strength among the trihalides of boron ?

(A) Trigonal planar structure (B) $p\pi - p\pi$ back bonding

(C) Hybridisation (D) None of the above

76. The Froth floatation process is based upon

(A) The difference in the specific gravity of ore and gangue particles

(B) The magnetic properties of gangue and ore

(C) Preferential wetting of ore particles by oil

(D) Preferential wetting of gangue particles by oil

77. When haloarenes react with sodium in the presence of ether, diphenyl is formed. This reaction is called

(A) Wurtz-Fittig reaction (B) Fittig reaction

(C) Sandmeyer reaction (D) Ulmann reaction

78. The order of boiling point among hydrogen halides is

(A) HF > HI > HBr > HCl (B) HF > HBr > HI > HCl

(C) HCl > HBr > HI > HF (D) HCl > HI > HBr > HF

79. Choose the correct order of increasing acidity

(A) p-nitrobenzoic acid < benzoic acid < p-aminobenzoic acid < p-chlorobenzoic acid

(B) p-aminobenzoic acid < benzoic acid < p-chlorobenzoic acid < p-nitrobenzoic acid

(C) benzoic acid < p-chlorobenzoic acid < p-nitrobenzoic acid < p-aminobenzoic acid

(D) p-nitrobenzoic acid < benzoic acid < p-chlorobenzoic acid < p-aminobenzoic acid

80. In Riemer-Tiemann reaction, the electrophile (dichlorocarbene) is generated by the reaction of

(A) CCl_4 and $Ca(OH)_2$ (B) $CaCl_2$ and CH_3OH

(C) Chlorine gas and CO_2 (D) Chloroform and NaOH

81. Which of the following substances have an antiseptic properties ?

(A) Phenelzine (B) Chloramphenicol

(C) Omeprazole (D) Chloroxylenol

82. Phenolphthalein is prepared by reacting phenol in the presence of conc.H_2SO_4 with

(A) Naphthalene (B) Phenyl hydrazone

(C) Benzylamine (D) Phthalic anhydride

83. Which of the following is absent in RNA?

(A) Adenine (B) Guanine

(C) Uracil (D) Thyamine

84. Which of the following elements shows the highest oxidation state ?

(A) *Mn* (B) *Fe*

(C) *V* (D) *Cr*

85. A binary solution of components A and B shows positive deviation if

(A) $p_A < p_A^o x_A$ and $p_B < p_B^o x_B$

(B) $\Delta H_{mixing} = 0$

(C) $\Delta V_{mixing} < 0$

(D) A - B interactions in the solution is weaker than A - A and B - B interactions in the pure components

86. Pressure remaining constant, at what temperature the volume of a gas will be double of its volume at 0°C ?

(A) 546 K (B) 283 K

(C) 275 K (D) 136.5 K

87. Which of the following amines react with nitrous acid to give yellow (oily) nitrosoamine and water?

(A) $(CH_3)_2NH$ (B) $(C_2H_5)_3N$

(C) $C_2H_5NH_2$ (D) All of these

88. Which of the following is least soluble in water ?

(A) HCOOH (B) CH_3COOH

(C) CH_3CH_2COOH (D) C_6H_5COOH

89. Which enzyme converts glucose into ethanol ?

(A) Invertase (B) Zymase

(C) Amylase (D) Maltase

90. Which of the following is a thermosetting polymer ?

(A) Bakelite (B) Polythene

(C) Polystyrene (D) Teflon

91. Which one of the following is not correct for Schottky defect ?

(A) Anions and cations are of almost similar sizes

(B) It affects the density of the crystal

(C) Equal number of cations and anions are missing from the crystal

(D) It occurs in ionic compounds having low coordination number

92. Consider the two gaseous equilibria involving SO_2 and the corresponding equilibrium constants at 298K

$SO_2(g) + \frac{1}{2} O_2(g) \rightleftharpoons SO_3(g)$; K_1

$2SO_3(g) \rightleftharpoons 2SO_2(g) + O_2(g)$; K_2

The value of the equilibrium constant are related by

(A) $K_2 = K_1$ (B) $K_2 = K_1^2$

(C) $K_2 = \frac{1}{K_1^2}$ (D) $K_2 = \frac{1}{K_1}$

93. Which one of the following has net dipole moment ?

(A) BF_3 (B) SO_2

(C) CCl_4 (D) CO_2

94. The bond enthalpy of $N \equiv N$, H–H & N–H bonds are given to be 945, 436 and 391 KJ mol^{-1} respectively. The enthalpy of the reaction

$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$ is

(A) +782 KJ (B) – 990 KJ

(C) + 1035 KJ (D) – 93 KJ

95. Which of the following transition metal *ion* forms coloured solution in aqueous medium ?

(A) Ti^{4+} (B) Sc^{3+}

(C) V^{2+} (D) Cu^{+}

96. Group-14 elements doped with Group-13 elements form

(A) n - type semiconductor (B) p - type semiconductor

(C) Alloy (D) Insulators

97. $KMnO_4$ act as an oxidising agent in

(A) Acidic medium only

(B) Alkaline and acidic medium only

(C) Alkaline medium only

(D) Neutral, acidic and alkaline medium

98. The sequence of ionic mobility in aqueous solution of these ions is

(A) $Cs^+ > Rb^+ > K^+ > Na^+$ (B) $Rb^+ > K^+ > Cs^+ > Na^+$

(C) $Na^+ > K^+ > Rb^+ > Cs^+$ (D) $K^+ > Na^+ > Rb^+ > Cs^+$

99. In Lassaigne's test, for detection of nitrogen, the blue colour is due to the compound

(A) $Fe_4[Fe(CN)_6]_3$ (B) $Na_4[Fe(CN)_6]_4$

(C) $Na_4[Fe(CN)_6]$ (D) NaCN

100. The ability of an ion to bring about coagulation of a given colloid depends upon

(A) Its charge

(B) The sign of the charge alone

(C) The magnitude of the charge

(D) Both magnitude and sign of charge

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