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1) **Which of the following solutions will be most concentrated**
a) 1m HCl b) 1 M HCl
c) 1% HCl d) Same concentration in all

2) **Which of the following one percent aqueous solution has the lowest freezing point?**
a) Sucrose (M.W = 342) b) Glucose (M.W = 180)
c) Sodium acetate (M.W = 82) d) Urea (M.W = 60)

3) **Molecular weight of a polymer can be best determined by measuring**
a) Osmotic pressure of the solution b) V.P. of solution
c) B.P of solution d) F.P of solution

4) **Increasing the temperature of an aqueous solution will cause**
a) Molality to increase b) Mole fraction to decrease
c) Molarity to decrease d) % by weight to increase

5) **The solution of sugar in water contains**
a) Free ions b) Free molecules
c) Free atoms d) Free, atoms and molecules

6) **Mole fraction of water in tap water will**
a) Equal to 1 b) Greater than 1 c) Will somewhat equal to 2 d) Less than 1

7) **What will be the molality of a solution containing 4.6g ethyl alcohol & 300g H_20?**
a) 0.33 b) 0.5 c) 0.1 d) None of these

8) **The number of moles Of NaOH present in 10 liters of 1 molar solution Is**
a) 10 b) 5 c) 1 d) 2.5

9) **Equal volume 0. 1 M $AgNO_3$ and 0.2 M NaCl are mixed. The concentration of nitrate ions in the mixture will be**
a) 0.1M b) 0.2M c) 0.05M d) 0.16M

10) **The pair of benzene and toluene represents**
a) –Ve deviation Raoult's law,
b) No deviation from Raoult's law
c) +Ve deviation from Raoult's law
d) Variable deviation from Raoult's law

11) **If the solubility of calcium fluoride in water is s moles per litre, its solubility product is given by**
a) 2s b) $4s^3$ c) $2s^2$ d) $2s^4$

12) **A binary mixture that forms a non-ideal solution has**
a) Boiling point lower than that of the pure solvent
b) Melting point higher than that of the pure solvent
c) Zero heat of solution.
d) Vapour pressure that may be higher or lower than that of the pure solvent.

13) **For a solution containing two volatile components, the graph between composition and temperature shows**
a) Two curves, one for liquid and the other for vapors
b) Only one curve.
c) Two separate curves for the two liquid components
d) Two curves for vapors only

14) **When a crystal of solute is added into the supersaturated solution, then**
a) The solute dissolves completely
b) The solution remains supersaturated
c) The excess solute crystallizes out
d) The solution becomes unsaturated

15) **Indicate the solution pairs which can be separated into their pure components by fractional distillation:**
a) Water and ethanol b) Water and HNO_3
c) Water and HCl d) Benzene and toluene

16) **Vapor pressure of a solution when a non-volatile solute is added, to a solvent is always**
a) More than the vapor pressure of the pure solvent
b) Equal to the vapor pressure of the solvent
c) Less than the vapor pressure of the pure solvent
d) Desorbing upon the nature of the solvent

17) **The aqueous solution of $CuSO_4$ is**
a) Acidic b) Basic c) Neutral d) None of these

18) **Which of the following solution has the lowest vapor pressure?**
a) 0.1m Urea b) 0.1m Glucose
c) 0.1m NaCl d) 0.1m Sucrose

19) **Pure water boils at 373K and HNO_3 boils at 359K. Azeotropic mixture of water & HNO_3 - boils at 393.5K. By distilling the azeotropic mixture**
a) Pure nitric acid will distill over first
b) Pure water will distill
c) One of them will distill over in a small amount of the other
d) Both of them will distill over in the same composition as that of the mixture being distilled

20) **When attraction between A –B is more than that of A-A and B-B, solution will show deviation from Raoult's law**
a) positive b) Negative
c) No deviation d) Cannot be predicted

21) **Molarity of 4% NaOH solution is**
a) 0.1 M b) 0.01 M c) 0.5 M d) 1.0 M

22) **Which of the following solutions will have the highest freezing point?**
a) 0.1 M $FeCl_3$ b) 0.1 M NaCl
c) 0.1 M $BaCl_2$ d) 0.1 M Urea

23) **Which one of the following statements is incorrect?**
A) A solution freezes at a lower temperature than the pure solvent.
b) A solution boils at a higher temperature than the pure solvent.
c) 0.1 NaCl solution and 0.1 M sugar solution have the same boiling point
d) Osmosis cannot take place without a semi-permeable membrane.

24) In a pair of immiscible liquids, a common solute dissolves in both &equilibrium is reached, then concentration of the solute in upper layer is
a) In fixed ratio with that in the lower layer
b) Lower than the lower layer
c) Same as the lower layer
d) Higher than the lower layer

25) The molarity of a solution prepared by adding 7.1 g of Na_2SO_4 (formula weight 142 amu) to enough water to make 100 ml volume is
a) 2.0 M b) 0.5 M c) 1.0 M d) 0.05 M

26) An aqueous solution of glucose is 10% in strength. The volume in which 1 gm mole of it is dissolved will be
a) 18 liters b) 0.9 litres c) 9 liters d) 1.8 liters

27) Which one of the following salt shows a falling curve of solubility with rise in temperature
a) KNO_3 b) NaCl c) $Ce_2(SO_4)_3$ d) $CaCl_2$

28) Which of the following solutions has the highest boiling point?
a) 5.85% solution of NaCl b) 6.05 solution of urea
c)18.0% solution of glucose d) All have same boiling points

29) Which of the following, when dissolved in water, gives negative heat of solution?
a) LiCl b) NaCl c) KCl d) $Pb(NO_3)_2$

30) The ebullioscopic constant, Kb, depends upon?
a) Amount of solute b) Nature of solvent
c) Amount of solvent d) Nature of solute

31) If a compound has a negative heat of solution, at high temperature it dissolves
a) More rapidly & is more soluble
b) Less rapidly &is less soluble
c) More rapidly &is less soluble
d) Less rapidly & is more soluble.

32) The correct order of hydration for the following ions is
a) $K^+ > H^+ > Cl^- > OH^-$ b) $H^+ > K^+ > Cl^- > OH^-$
c) $Cl^- > K^+ > H^+ > OH^-$ d) $H^+ > OH^- > Cl^- > K^+$

33) In $CuSO_4.5H_2O$, out of five water molecules. How much water surrounds Cu^{+2}
a) 1 b) 2 c) 3 d) 4

34) Azeotropic mixture can be separated by
a) Vacuum distillation b) Fractional distillation
c) Chemical method d) Both a' and 'c'

35) Which one of the following salt produces acidic solution on hydrolysis
a) Na_2CO_3 b) CH_3COONa c) Na_2SO_4 d) $CuSO_4$

36) Molality of an aqueous solution that produces elevation of boiling point of 1.00 K at 1 atm pressure (Kb for water = 0.512 K.Kg.mol^{-1})
a) 0.512 m b) 0.915 m c) 1.95 m d) 5.12 m

37) A 0.1L 0.5M solution of sulfuric acid is mixed with 0.2L 0.1M phosphoric acid, the concentration of H+ ions in the resultant solution.
a) 0.3M b) 0.2M c) 0.53M d) None of these

38) Which Of the following unit of concentration is not independent of temperature?
a) Molarity b) Molality c) Mole fraction d) All

39) Which of the following statement is true about ideal solutions?
a) Change in volume is zero b) Change in enthalpy is zero
c) Vapor pressure change is zero d) Both a and b

40) The addition of sodium chloride to water, while boiling eggs results to:
a) Decrease boiling point of water b) Increase the boiling point of water c)Prevent breaking of eggs
d)Make egg tasty

41) Which pair of the following will not form an ideal solution?
a) $C_2H_5Br + C_2H_5I$ b) $H_2O + C_4H_9OH$
c) $C_6H_{14} + C_7H_{16}$ d) $CCl_4 + SiCl_4$

42) The study of elevation of boiling point is called:
a) Ebullioscopy b) Cryoscopy
c) Osmometer d) None of these

43) The relative lowering of vapor pressure is equal to:
a) Mole fraction of solvent b) Mole fraction of solution
c) The molar mass of solute d) Mole fraction of solute

44) there are types of solution
a) Six b) three c) nine d) all

45) Which one is completely miscible solution?
a) Water and phenol b) water and alcohol
c) water and benzene d) all

46) Which one is partially miscible solution?
a) Water and phenol b) water and alcohol
c) water and benzene d) all

47) Which one is practically immiscible solution?
a) Water and phenol b) water and alcohol
c) water and benzene d) all

48) When phenol added in water then .....
a) Water have the lower layer
b) phenol has the lower layer
c) both have lower layer d) none

49) Which one is not true for ideal solution?
a) Obey Raoult's law b) $\Delta V=0$
c) $\Delta H=O$ d) none of these

50) Solubility curve of is almost straight.
a) $NaNO_3$ b) KCl c) NaCl d) all

51) Which compound show discontinuous solubility curve?
a) $NaNO_3$ b) KCl c) NaCl d) $Na_2SO_4.10H_2O$

52) Alcohol and ether mix in all proportions, so known as
a) completely miscible b) partially miscible
c) immiscible d) none of these

53) Fog is the example of which type of solution
a) gas-gas b)solid -gas c) liquid-gas d) solid-solid

54) **Solubility of $CuSO_4$ at 100°C is**
a) 37.5g/100g b)14.3g / 100g
c) 75.4g / 100g d) 5g /100g

55) **K_f value for water is**
a) 1.86 b) 5.10 c) 1.79 d) 3.90

56) **Molarity of pure water is**
a) 1 b) 18 c) 55.5 d) 6

57) **Consulate temperature for water aniline system is**
a) 65.9°C b) 167.0°C c) 49.1 °C d) 85 °C

58) **Elevation of boiling point is directly proportional to**
a) molarity b) molality
c) mole fraction of solute d) none of these

59) **10g of NaOH has been dissolved perdm^3 of solution. The molarity of solution is:**
(a) 0.5M (b) 0.25M (c) 1M (d) 2M

60) **Which of the following concentration unit is used for very dilute solutions:**
(a) Molarity (b) Normality (c) Molality (d) ppm

61) **Which of the following concentration unit is not affected by temperature:**
(a) Molarity (b) Normality (c) Molality (d) ppm

62) **Which pair of mixture is called non-ideal solution:**
(a) $C_2H_5OH + H_2O$ (b) $HCl + H_2O$
(c) $NH_3 + H_2O$ (d) All of these

63) **The number of moles of a solute per kg of solvent is called:**
(a) Molarity (b) Normality
(c) Molality (d) Mole fraction

64) **About Rault's law which expression is correct:**
(a) $P = P^oX_1$ (b) $\Delta P = P^oX_2$
(c) $\Delta P/P^o = X_2$ (d) All of these

65) **The solution of NH_4Cl and $CuSO_4$ in H_2O are:**
(a) Acidic (b) Basic (c) Neutral (d) All of these

66) **Which of the following liquid-pairs will obey Raoult's law:**
(a) $C_2H_5OH + H_2O$ (b) $CH_3COCH_3 + CHCl_3$
(c) $C_2H_5I + C_2H_5Br$ (d) $HCl + H_2O$

67) **18g glucose is dissolved in 90g of H_2O. The relative lowering of vapor Pressure is equal to:**
(a) 1/5 (b) 5.1 (c) 1/51 (d) 6

68) **Which of the following solution will show maximum depression in freezing point:**
(a) 0.1m NaCl (b) 0.1m $BaCl_2$
(c) 0.1m $FeCl_3$ (d) All have same value

69) **During the distillation of Azeotropic mixture its:**
(a) Boiling point remains constant
(b) Composition remains constant
(c) Boiling point increases (d) Boiling point decreases

70) **Molarity of a solution is expressed in**
(a) moles/kg (b) g dm^{-3} (c) dm^3 mol^{-1} (d) moles dm^{-3}

71) **The cryoscopic constant of water is 1.86°C. The elevation of B.P. for a 0.1 m solution of a solute in water is**
(a) 18.6°C (b) 1.86°C (c) 0.186°C (d) none of these

72) **Weight of a solute dissolved per 100parts by weight of solution is called as.**
a) % w/w b) % w/v c) %v/w d) %v/v

73) **Number of cm^3 of solute dissolved in per 100g of the solution is called as.**
a) %w/v b) %v/v c) %w/w d) %v/w

74) **Which is an example of liquid in solid?**
a) Sugar in water b) Mercury in silver
c) Metal alloys pearls d) O2 in water

75) **Ratio of the number of moles of it the total number of moles of all components present is.**
a) Parts per million b) Molarity
c) Mole fraction d) Mole number

76) **Phenol-water system comes under type of liquid in liquid solutions.**
a) Completely miscible b) Immiscible
c) Partially miscible d) All

77) **k_f value for benzene is**
a) 1.86 b) 5.10 c) 1.79 d) 3.90

78) **The molal boiling point constant is the ratio of the elevation in boiling point to**
a) molarity b) molality
c) mole fraction of solvent
d) mole fraction of solute.

79) **Hydration energy of F- is**
a) -460 b) -351 c) -384 d) -457

80) **Every sample of matter with uniform properties and a fixed composition is called.**
a) Solution b) Binary solution c) Phase d) State

81) **Component of solution which is in large quantity is called as.**
a) Solution b) Solvent c) Solute d) Concentrate

82) **Number of moles of solute dissolved in one liter of the solution is called as.**
a) Normality b) Equality c) Molarity d) Molality

83) **CO_2 in water is an example of solution.**
a) Gas in gas b) Liquid in gas
c) Gas in solid d) Gas in liquid

84) **Dust particles in smoke are example of.**
a) Solid in solid b) Gas in solid
c) Solid in gas d) Solid in liquid

85) **Unit which is used for very low concentrations of solution is called as.**
a) Mole fraction b) Parts per million
c) Normality d) Molarity

86) **The amount of NaOH required preparing 250 cm^3 of 0.1 M solution is**
(a) 1 g (b) 2 g (c) 10 g (d) 6 g

87) **An aqueous solution of ethanol in water has vapour pressure:**
(a) Equal to that of water (b) equal to that of ethanol
(c) more than that of H_2O (d) less than that of water

88) **Which law is the best criterion for judgment of ideality of a solution?**
(a) Henry's law (b) Raoult's law
(c) Vant' Hoff law (d) Ostwald's law

89) **if mole fraction for a reaction is 0.5 the mole percent will be**
a) 20% b) 25% c) 50% d) none of these

90) **Which statement is wrong for colligative property of solutions**
b) Not depend upon nature of solute b) not depend upon nature of solvent
c) Depend upon number of particles of solvent d) depend upon number of particles of solute

91) **Solution of ethanol in water shows**
a) +Ve deviation b) –Ve deviation
c) ideal behavior d) obyes Raoult's law

92) **The unit of mole fraction,while considering the partial pressure of gases**
a) Torr b) atm c) Pascal d) none of these

93) **Opal is an example of solution**
a) Solid in liquid b) liquid in solid
c) solid in solid d) all are possible

94) **Which one is not the example of liquid in solid**
a) Butter b) paint c) cheese d) Hg in silver

95) **Ether dissolves water in an extent of**
a) 1.2% b) 6.5% c) 5% d) 30%

96) **Which is not practically immiscible liquids**
a) Water and benzene b) water and CS_2
c) water and tri-ethylamine d) all of these

97) **If 24gm of unknown solute is dissolved in 250cm^3 of water to get 4M solution. The molar mass of solute is**
a) 56g/mol b) 40g/mol c) 24 g/mol d) 80 g/mol

98) **The sum of mole percent of all the components is**
a) unity b) 100 c) zero d) none of these

99) **Molality of 2% w/w solution of NaOH is**
a) 0.5 b) 0.05 c) 2.5 d) 0.25

100) **In 1m solution of sucrose, the total mass of solution is**
a) 1000 gm b) 1342 gm c) 1180 gm d) 1000kg

101) **Sea water contains 5.65x10^{-3} g of dissolved oxygen in 1kg of water. Amount in ppm is**
a) 56.5 b) 5.65 c) 565 d) 5.65x10^3

102) **H_2SO_4 is 98% w/w solution and its density is 1.84 g/cm^3. The molarity of solution is**
a) 17 b) 18 c) 15.9 d) 11.73

103) **What is the mass of urea in 100gm of water in 0.3 molal solution**
a) 16g b) 18g c) 1.8g d) none of these

104) **The vapor pressure of solvent is 20 torr and the vapor pressure of solution is 18 torr. What will be the mole fraction of solute?**
a) 1 b) 0.1 c) 0.9 d) zero

105) **In 1molal solution of glucose the mole fraction of solute is**
a) 1 b) 18 c) 0.0177 d) none of these

106) **In the fractional distillation of ethanol and water, the final distillate obtained is**
a) ethanol b) water c) rectified spirit
d) mixture of all these

107) **The solubility of which salt is not affected by change in temperature?**
a) KCl b) NaCl c) $CaCl_2$ d) all of these

108) **Beckmann thermometer can read upto**
a) 1k b) 0.1k c) 0.001k d) 0.01k

109) **Anti-freeze used in automobile radiator is**
a) ethylene glycol b) methylene glycol
c) methyl alcohol d) both a and c

110) **The salt to make the freezing mixture is**
b) NaCl b) KNO_3 c) $NaNO_3$ d) both a and b

111) **Which of the following ion has the highest value of hydration energy**
a) F^- b) Cl^- c) B^{r-} d) I^-

112) **Enthalpy of solution is negative for**
a) NaCl b) LiCl c) KCl d) KNO_3

113) **Epsom salt is**
a) di-hydrate b) penta-hydrate
c) hepta-hydrate d) anhydrate

114) **Aqueous solution of Na_2SO_4 turns litmus solution**
a) blue b) red c) green d) no effect

115) **A solution contains A,B, and C gases. The concentration of individual gas will be expressed in**
a) molality b) molarity
c) mole fraction d) ppm

116) **Which of the following salt does not hydrolyze in water**
b) $CuSO_4$ b) Na_2CO_3 c) $NaSO_4$ d) all of these

117) **Aqueous solutions boil at 100.52°C. It should freeze at:**
(a) 0°C (b) -1.86°C (c) -2°C (d) +1.86°C

118) **Which cation has least heat of hydration**
a) Li+ b) Na+ c) K+ d) Mg+2

119) **10% aqueous solution of glucose freezes at**
a) less than 0^{0}C b) greater than 0^{0}C
c) equal to 0^{0}C d) all of these