**Time :** 08:35:00 **CHEMISTRY**

**Marks :** 2060

2.SOLUTIONS

**Single Correct Answer Type**

1. A super saturated solution is a metastable state of solution in which solute concentration.

a) Is equal to the solubility of that substance in water

b) Exceeds than its solubility

c) Less than its solubility

d) Continuously change

2. Colligative properties of a solution depends upon

a) Nature of both solvent and solute b) Nature of solute only

c) Number of solvent particles d) The number of solute particles

3. The partition coefficient of solute in between immiscible liquids and is 10 in favour of . The partition coefficient of in favour of is :

a) 0.1 b) 10 c) 0.01 d) 100

4. Which one is a colligative property?

a) Raoult’s law states that the vapour pressure of a component over a solution is proportional to its mole fraction

b) The osmotic pressure ()of a solution is given by the equation = *MRT*, where , *M* is the molarity of the solution

c) The correct order of osmotic pressure for 0.01 M aqueous solution of each compound is sucrose

d) Two sucrose solutions of same molality prepared in different solvents will have the same freezing point depression

5. At , the highest osmotic pressure is exhibited by 0.1 M solution of

a) Urea b) Glucose c) KCl d)

6. The vapour pressure of two liquids *X* and *Y* are 80 and 60 Torr respectively. The total vapour pressure of the ideal solution obtained by mixing 3 moles of *X* and 2 moles of *Y* would be

a) 68 Torr b) 140 Torr c) 48 Torr d) 72 Torr

7. Dilute 1 L one molar solution by 5 L water, the normality of that solution is

a) 0.33 N b) 33.0 N c) 0.11 N d) 11.0 N

8. Solution *A* contains 7 g/L of and solution *B* contains 7 g/L of NaCl. At room temperature, the osmotic pressure of

a) Solution *A* is greater than *B*

b) Both have same osmotic pressure

c) Solution *B* is greater than *A*

d) Cannot be determine

9. Which one of the following aqueous solutions will exhibit highest boiling point?

a) b) c) 0.015 M urea d) 0.015 M glucose

10. The modal elevation constant of water is . The boiling point of 1.0 modal aqueous KCl solution (assuming complete dissociation of KCl), therefore, should be

a) b) c) d)

11. The increase in boiling point of a solution containing 0.6 g urea in 200 g water is Find the molal elevation constant.

a) 10 K kg b) 10 K g c) 10 K kg mol d) 1.0 K kg

12. Which is correct representation of phase rule?

a)

b)

c)

d) None of these

13. 40% by weight solution will contain how much mass of the solute in 1L solution, density of the solution is 1.2 g/mL?

a) 480 g b) 48 g c) 38 g d) 380 g

14. 20 g of binary electrolyte (mol. wt. =100) are dissolved in 500 g of water. The depression in freezing point of the solution is ( the degree of ionisation of the electrolyte is

a) 0% b) 100% c) 75% d) 50%

15. What is the molality of pure water?

a) 1 b) 18 c) 55.5 d) None of these

16. Iodine was added to a system of water and . The concentrations of iodine in water and were found to be respectively. The ratio will not change only if :

a) More iodine is added

b) More water is added

c) More is added

d) The temperature is changed

17. Which of the following associated with isotonic solutions is not correct?

a) They will have the same osmotic pressure

b) They will have the same vapour pressure

c) They have same weight concentrations

d) Osmosis does not take place when the two solutions are separated by a semipermeable membrane

18. The freezing point (in of a solution containing 0.1 g of (mol.wt.329) in 100 g of water is : ()

a) b) c) d)

19. The Henry’s law constant for the solubility of gas in water at 298 K is . The mole fraction of In air is 0.8 The number of moles of from air dissolved in 10 moles of water of 298 K and 5 atm pressure is

a) b) c) d)

20. Van’t Hoff factor more than unity indicates that the solute in solution has

a) Dissociated b) Associated c) Both (a) and (b) d) Cannot say anything

21. The condition for the validity of Henry’s law are :

a) The pressure should not be too high

b) The temperature should not be too low

c) The gas should neither dissociate not enter into chemical combination with solvent

d) All of the above

22. In an osmotic pressure measurement experiment, a 5% solution of compound ‘*X’* is found to be isotonic with a 2 % acetic acid solution . The gram molecular mass of ‘*X*’ is

a) 24 b) 60 c) 150 d) 300

23. Which is a colligative property ?

a) Osmotic pressure b) Free energy c) Heat of vaporisation d) Change in pressure

24. for water is 1.86 K-kg-. If your automobile radiator holds 1.0 kg of water, how many grams of ethylene glycol must you add to get the freezing point of the solution lowered to ?

a) 93 g b) 39 g c) 27 g d) 72 g

25. Vapour pressure of a solvent containing non-volatile solute is :

a) More than the vapour pressure of a solvent

b) Less than the vapour pressure of solvent

c) Equal to the vapour pressure of solvent

d) None of the above

26. Among the following mixtures, dipole-dipole as the major interaction is present in :

a) Benzene and ethanol

b) KCl and water

c) Acetonitrile and acetone

d) Benzene and

27. The vapour pressure of water depends upon :

a) Surface area of container

b) Volume of container

c) Temperature

d) All of these

28. Which of the following solution highest boiling point?

a) 0.1 M urea b) 0.1 M sucrose c) 0.1 M d) 0.1 M

29. At certain temperature a 5.12% solution of cane sugar is isotonic with a 0.9% solution of an unknown solute. The molar mass of solute is

a) 60 b) 46.17 c) 120 d) 90

30. A mixture of ethane and ethene occupies 41 L at 1 atm and 500 K. the mixture reacts completely with mole of to produce and . The mole fraction of ethane and ethene in the mixture are respectively

a) 0.50, 0.50 b) 0.75, 0.25 c) 0.67, 0.33 d) 0.25, 0.75

31. If sodium sulphate is considered to be completely dissociated into cations and anions in aqueous solution, the change in freezing point of water (), when 0.01 mole of sodium sulphate is dissolved in 1 kg of water, is (

a) 0.0372 K b) 0.0558 K c) 0.0744 L d) 0.0186 K

32. 2.5 L of NaCl solution contain 5 moles of the solute.What is the molarity ?

a) 5M b) 2M c) 2.5M d) 12.5M

33. If for a sucrose solution elevation in boiling point is then what will be boiling point of solution for the same molal concentration?

a) 0.1 b) 0.2 c) 0.16 d) 0.26

34. In two solutions having different osmotic pressure, the solution of higher osmotic pressure is called :

a) Isotonic solution

b) Hypertonic solution

c) Hypotonic solution

d) None of these

35. Isotonic solution have the same

a) Normality b) Density c) Molar concentration d) None of these

36. Vapour pressure of pure *A* = 100 torr, moles = 2; vapour pressure of pure *B*=80 torr, moles = 3. Total vapour pressure of the mixture is

a) 440 torr b) 460 torr c) 180 torr d) 88 torr

37. Which of the following is incorrect?

a) Relative lowering of vapour pressure is independent of the solute and the solvent.

b) The relative lowering of vapour pressure is a colligative property.

c) Vapour pressure of a solution is lower than the vapour pressure of the solvent.

d) The relative lowering of vapour pressure is directly proportional to the original pressure.

38. Density of a 2.05 M solution of acetic acid in water is 1.02 g/mL. The molality of the solution is

a) 23.077% b) 230.77% c) 2.3077% d) 0.23077%

39. The atmospheric pressure is sum of the

a) Pressure of the biomolecules

b) Vapour pressure of atmospheric constituents

c) Vapour pressure of chemicals and vapour pressure of volatiles

d) Pressure created on to atmospheric molecules

40. Lowering in vapour pressure is the highest for:

a)

b)

c)

d)

41. molecules of urea are present in 100 mL of its solution. The concentration of urea solution is

a) 0.1 M b) 0.01 M c) 0.001 M d) 0.02 M

42. The osmotic pressure (At) of an aqueous solution (200 mL) containing 6 g of a protein is If R=0.080 L atm , the molecular weight of protein is

a) b) c) d)

43. 100 cc of 0.6 N and 200 cc of 0.3 N HCl were mixed together. The normality of the solution will be

a) 0.2 N b) 0.4 N c) 0.8 N d) 0.6 N

44. Mole fraction of any solution is equal to

a) b)

c) d)

45. Which is not a colligative property in the following?

a) pH ofa buffer solution b) Boiling point elevation

c) Freezing point depression d) Vapour pressure lowering

46. The normality of 10% (weight/volume) acetic acid is

a) 1 N b) 1.3 N c) 1.7 N d) 1.9 N

47. Two solutions have different osmotic pressure. The solution of lower osmotic pressure is called :

a) Isotonic solution

b) Hypertonic solution

c) Hypotonic solution

d) None of these

48. Osmatic pressure is 0.0821 atm at temperature of 300 K. Find concentration in mole per litre

a) 0.33 b) c) d)

49. A 5% solution of cane sugar (molar mass 342) is isotonic with 1% of a solution of an unknown solute. The molar mass of unknown solute in g/mol is

a) 136.2 b) 171.2 c) 68.4 d) 34.2

50. The distribution law holds good for :

a) Heterogeneous systems b) Homogeneous systems c) Both (a) and (b) d) None of these

51. Two solutions of and are prepared separately. Molarity of both is 0.1 M and osmatic pressures are and respectively. The correct relationship between the osmatic pressures is

a) b) c) d)

52. The freezing point of aqueous solution that contains 5% by mass urea, 1.0% by mass KCl and 10% by mass of glucose is : ()

a) 290.2 K b) 285.5 K c) 269.93 K d) 250 K

53. Which of the following solutions has the highest normality?

a) 6 g of /100 b) c) N phosphoric acid d) 8 g of KOH/L

54. 100 of 0.3 is mixed with 200 mL of . The final normality of the resulting solution will be

a) 0.3 N b) 0.2 N c) 0.5 N d) 0.1 N

55. A solute when distributed between two immiscible phases remains associated in phase II and dissociated in phase I. If is the degree of dissociation and is the number of molecules associated then :

a) b) c) d)

56. Which solution would exhibit abnormal osmotic pressure?

a) Aqueous solution of urea

b) Aqueous solution of common salt

c) Aqueous solution of glucose

d) Aqueous solution of sucrose

57. If is the degree of dissociation of the van’t Hoff factor (*i*) used for calculating the molecular mass is

a) b) c) d)

58. The temperature at which vapour pressure of a solvent in its liquid and solid phase becomes same is called :

a) b. p. b) f. p. c) Krafft point d) None of these

59. The vapour pressure of a pure liquid *A* is 40 mm Hg at 310 K. The vapour pressure of this liquid in a solution with liquid *B* is 32 mm Hg. What is the mole fraction of *A* in the solution if it obeys the Raoult’s law?

a) 0.5 b) 0.6 c) 0.7 d) 0.8

60. Which of the following shows maximum depression in freezing point?

a) b) NaCl c) Urea d) glucose

61. The substances whose solubility decreases with increase in temperature :

a) b) c) d) All of these

62. 3.65 g of is dissolved in 16.2 g of water. The mole fraction of HCl in the resulting solution is

a) 0.1 b) 0.2 c) 0.3 d) 0.4

63. How many moles of would be in 50 g of the substance?

a) 0.083 mol b) 0.952 mol c) 0.481 mol d) 0.140 mol

64. Phenol dimerises in benzene having van’t Hoff factor 0.54. What is the degree of association?

a) 1.92 b) 0.98 c) 1.08 d) 0.92

65. 0.004 M is isotonic with 0.01 M glucose.Degree of dissociation of is

a) 61 b) 244 c) 366 d) 122

66. What is the freezing point of a solution containing 8.1 g in 100 g water assuming the acid to be 90% ionised ( for water )?

a) b) c) d)

67. Choose the correct statement.

When concentration of a salt solution is increased

a) Boiling point increases while vapour pressure decreases.

b) Boiling point decreases while vapour pressure increases.

c) Freezing point decreases while vapour pressure increases.

d) Freezing point increases while vapour pressure decreases.

68. Which of the following aqueous solutions produce the same osmotic pressure?

(i)0.1 M solution

(ii) 0.1 M glucose solution

(iii)0.6 g urea in 100 mL solution

(iv)1.0 g of a non-electrolyte solute in 50 mL solution (molar mass of )

a) (i), (ii), (iii) b) (ii), (iii), (iv) c) (i), (ii), (iv) d) (i), (iii), (iv)

69. In the case of osmosis, solvent molecules move from :

a) Higher vapour pressure to lower vapour pressure

b) Higher concentration to lower concentration

c) Lower vapour pressure to higher vapour pressure

d) Higher osmotic pressure to lower osmotic pressure

70. If the temperature increase from at atmospheric pressure, which of the following processes is expected to take place more in case of liquids?

a) Freezing b) Vaporization c) Sublimation d) None of these

71. The freezing point of water is depressed by in a 0.01 mol NaCl solution. The freezing point of 0.02 molal solution of urea is depressed by

a) Hypotonic b) Isotonic c) Equimolar d) Hypertonic

72. Camphor is used as solvent to determine mol. wt. of non-volatile solute by Rast method because for camphor :

a) It is readily available

b) It is volatile

c) Molal depression constant is high

d) It is solvent for organic substances

73. The van’t Hoff factor for a compound which undergoes dissociation in one solvent and association in other solvent is respectively :

a) Greater than one and greater than one

b) Less than one and greater than one

c) Less than one and less than one

d) Greater than one and less than one

74. The melting point of most of the solid substances increase with an increase of pressure acting on them. However, ice melts at a temperature lower than its usual melting point, when the pressure increase. This is because :

a) Ice is less denser than water

b) Pressure generates heat

c) The bonds break under pressure

d) Ice is not a true solid

75. Partition coefficient of benzoic acid-ether-water in favour of ether is 2. A solution containing 8 g/litre benzoic acid in ether layer is shaken with 2 litre water. The concentration of acid in water layer is :

a) 1 b) 2 c) 3 d) 4

76. A solution is prepared by dissolving 24.5 g of sodium hydroxide in distilled water to give 1L solution. The molarity of NaOH in the solution is

(Given, that molar mass of NaOH )

a) 1000 g of solvent b) 1 L of solvent c) 1 L of solution d) 1000 g of solution

77. Molecular weight of glucose is 180. A solution of glucose which contains 18 g/L, is

a) 0.1 molal b) 0.2 molal c) 0.3 molal d) 0.4 molal

78. The elevation in boiling point for one molal solution of a solute in a solvent is called :

a) Cryoscopic constant

b) Boiling point constant

c) Molal ebullioscopic constant

d) None of the above

79. of 0.2 N HCl is titrated against 0.1 N NaOH solution. The titration is discontinued after adding of NaOH. The remaining titration is completed by adding 0.5 NKOH. The volume of KOH required for completing the titration is

a) b) c) d)

80. The depression in f. p. of 0.01 aqueous solution of urea, sodium chloride and sodium sulphate is in the ratio :

a) 1 : 1 : 1 b) 1 : 2 : 3 c) 1 : 2 : 4 d) 2 : 2 : 3

81. Colligative properties are used for the determination of

a) Molar mass b) Equivalent weigh

c) Arrangement of molecules d) Melting and boiling points

82. In a solution of 7.8 g benzene and 46.0 g toluene , the mole-fraction of benzene is

a) b) c) d)

83. Mole fraction of solute in an aqueous solution which boils at 100.104. for = 0.52 K :

a) b) 0.004 c) d) 0.996

84. On a humid day in summer, the mole fraction of gaseous a (water vapour) in the air at can be as high as 0.0287. Assuming a total pressure of 0.977 atm. What is the partial pressure of dry air?

a) 94.9 atm b) 0.949 atm c) 949 atm d) 0.648 atm

85. The natural semipermeable membrane is :

a) Gelatinous

b) Gelatinous

c) Plant cell

d) Phenol layer

86. Which of the following is true when components forming an ideal solution are mixed?

a) b) c) d)

87. The energy that opposes the dissolution of a solute in a solvent is called :

a) Solvent energy

b) Hydration energy

c) Lattice energy

d) Ionization energy

88. If molecular interaction of two different liquid molecules are stronger than the molecular interactions of the same liquid molecules the mixture is expected to show :

a) Positive deviations

b) Negative deviations

c) No deviations

d) Positive as well as negative deviations

89. Which of the following is not correct for ideal solution?

a) b) c) d) Obeys Raoult’s law

90. When mercuric iodide is added to the aqueous solution of potassium iodide, the

a) Freezing point is raised b) Freezing point is lowered

c) Freezing point does not change d) Boiling point does not change

91. Which statement is wrong for distribution law?

a) The two solvents should be mutually immiscible

b) The substance should not chemically react with any of the two solvents

c) The temperature should not change during experiment

d) The concentration of the solute in both the solvents must be kept high

92. How much of 0.1 M solution is required to neutralise 50 mL of 0.2 M NaOH solution?

a) 50 mL b) 5.0 mL c) 0.50 mL d) 100 mL

93. A 0.5 molal aqueous solution of a weak acid (H*X*) is 20 per cent ionized. The lowering in freezing point of this solution is :

a) 0.56 K b) c) 1.12 K d)

94. A solution of 4.5 g of a pure non-electrolyte in 100 g of water was found to freeze at . The molecular weight of the solute closest to ()

a) 135.0 b) 172.0 c) 90.0 d) 180.0

95. If and are the vapour pressure of solvent and solution respectively and and are the mole of solute and solvent then :

a)

b)

c)

d) All of the above

96. A solution is prepared by dissolving 24.5 g of sodium hydroxide in distilled water to give 1L solution. The molarity of NaOH in the solution is

(Given, that molar mass of NaOH )

a) 0.2450 M b) 0.6125 M c) 0.9800 M d) 1.6326 M

97. The relative lowering of vapour pressure of a dilute aqueous solution containing non-volatile solute is 0.0125. The molality of the solution is about

a) 0.70 b) 0.50 c) 0.90 d) 0.80

98. The freezing point (in) of solution containing 0.1 g of in 100 g of water ()is

a) b) c) d)

99. If 0.15 g of a solute, dissolved in 15 g of solvent, is boiled at a temperature higher by than that of the pure solvent. The molecular weight of the substance (molal elevation constant for the solvent is is

a) 100 b) 10.1 c) 10 d) 1.001

100. Molarity of 0.2 N is

a) 0.2 b) 0.4 c) 0.6 d) 0.1

101. When an ideal binary solution is in equilibrium with its vapour, molar ratio of the two components in the solution and in the vapour phase is :

a) Same

b) Different

c) May or may not be same depending upon volatile nature of the two components

d) None of the above

102. In a 0.2 molal aqueous solution of a weak acid , the degree of ionization is 0.3. Taking for water as 1.85, the freezing point of the solution will be nearest to

a) b) c) d)

103. The distribution law was given by :

a) Henry b) Nernst c) van’t Hoff d) Ostwald

104. Which of the following is incorrect?

a) 0.1 m sucrose b) 0.1 m urea c) 0.1 m ethanol d) 0.1 m glucose

105. When 20 g of naphthoic acid () is dissolved in 50 g of benzene (), a freezing point depression of 2 K is observed. The van’t Hoff factor (*i*) is

a) 0.5 b) 1 c) 2 d) 3

106. The vapour pressure of water at is 17.54 mm. When 20 g of a non-ionic, substance is dissolved in 100 g of water, the vapour pressure is lowered by 0.30 mm. What is the molecular mass of the substance?

a) 200.8 b) 206.88 c) 210.5 d) 215.2

107. The highest temperature at which vapour pressure of a liquid can be measured is :

a) b.p. of liquid

b) Critical temperature

c) Critical solution temperature

d) Inversion temperature

108. Solution *A* contains 7 g/L of and solution *B* contains 7 g/L of NaCl. At room temperature, the osmotic pressure of

a) 50 b) 180 c) 102 d) 25

109. When g solute (molecular mass ) dissolves in g solvent, the molality of the solution is

a) b) c) d)

110. The statement “the relative lowering of the vapour pressure is equal to th ratio ot moles of the solute to the total number of the moles in the solution” refers to

a) Hess’s law b) Dalton’s law c) Raoult’s law d) Charles’law

111. Elevation in boiling point was when 6 g of a compound was dissolved in 100 g of water. Molecular weight of *X* is (water is per 100 g water )

a) 120 b) 60 c) 600 d) 180

112. The amount of anhydrous present in 250 mL of 0.25 M solution is

a) 6.625 g b) 66.25 g c) 662.5 g d) 6625 g

113. The azeotropic mixture of water (b. pt.) and (b.pt. ) boils at .When this mixture is distilled it is possible to obtain

a) Pure HCl b) Pure water

c) Pure water as well as HCl d) Neither HCl nor in their pure states

114. A 5% solution of sugarcane (mol. wt. = 342) is isotonic with 1% solution of *X* under similar conditions. The molecular weight of *X* is

a) 136.2 b) 689.4 c) 34.2 d) 171.2

115. Van’t hoff factor of is

a) One b) Two c) Three d) four

116. Which of the following is incorrect?

a) Relative lowering of vapour pressure is independent

b) Vapour pressure of a solution is lower than the vapour pressure of the solvent

c) The vapour pressure is a colligative property

d) The relative lowering of vapour pressure is directly proportional to the mole fraction solute

117. One gram of silver gets distributed between of molten zinc and of molten lead at The percentage of silver still left in the lead layer in approximately

a) Henry b) Van’t Hoff c) Nernst’s d) Ostwald

118. Two solutions of glucose have osmotic pressure 1.0 and 3.5 atm. If 1 L of first solution is mixed with L of second solution, the osmotic pressure of the resultant solution becomes 2.5 atm. Volume of second solution is

a) 1.0 L b) 1.5 L c) 2.5 L d) 3.5 L

119. 5% (wt./vol.) aqueous NaCl solution and 5% (wt./vol.) aqueous KCl solution are :

a) Isotonic b) Isomolar c) Equinormal d) None of these

120. Azeotropic mixture are

a) Constant temperature boiling mixture b) Those which boils at different temperatures

c) Mixture of two solids d) None of the above

121. Boiling point of water is defined as the temperature at which :

a) Vapour pressure of water is equal to one atmospheric pressure

b) Bubbles are formed

c) Steam comes out

d) None of the above

122. When a solute distributes itself between two immiscible liquids in contact with each other, a mathematical constant ratio exists between :

a) The weight of the solute in the two liquids

b) The concentration of solute in the two liquids

c) The number of mole of the solute in the two liquids

d) The number of atoms of the solute in the two liquids

123. The molal elevation constant for water is 0.52. What will be the boiling point of 2 molar sucrose solution at 1 atm pressure? (Assume b.p. of pure water is )

a) b) c) d)

124. The molal elevation/depression constant depends upon :

a) Nature of solvent

b) Nature of solute

c) Temperature

d) solution

125. When 10 g of a non-volatile solute is dissolved in 100 g of benzene, it raises boiling point by then molecular mass of the solute is ( for )

a) 223 g b) 233 g c) 243 g d) 253 g

126. According to phase rule, if then must be equal to :

a) 2 b) 1 c) Zero d) 4

127. A thermometer which can be used only for accurate measurement of small differences in temperature is known as a:

a) Beckmann thermometer

b) Contact thermometer

c) Clinical thermometer

d) Platinum resistance thermometer

128. When two liquids and are mixed then their boiling points becomes greater than both of them. What is the nature of this solution?

a) Ideal solution b) Normal solution

c) Negative deviation with non-ideal solution d) Positive deviation with non-ideal solution

129. The plots of (where respectively) is linear with slope and intercepts respectively:

a) and

b) and

c) and

d) and

130. Which of the following liquid pair shows a positive deviation from Raoult’s law?

a) Water-nitric acid b) Acetone-chloroform

c) Water-hydrochloric acid d) Benzene-methanol

131. What is the total number of moles of needed to prepare 5.0 L of a 2.0 M solution of ?

a) 2.5 b) 5.0 c) 10 d) 20

132. The van’t hoff factor for 0.1 m solution is 2.74. The degree of dissociation is

a) 91.3% b) 87% c) 100% d) 74%

133. The solubility of iodine in water is 0.8 g/L. If the partition coefficient of iodine between and water (in favour of is 82, the solubility of iodine in is :

a) 102.5 g/L b) 65.6 g/L c) 0.009 g/L d) 81.2 g/L

134. An aqueous solution of 6.3 g oxalic acid dihydrate is made up to 250 mL. The volume of 0.1 N sodium hydroxide required to completely neutralise 10 mL of this solution is

a) 40 mL b) 20 mL c) 10 mL d) 4 mL

135. One gram of silver gets distributed between of molten zinc and of molten lead at The percentage of silver still left in the lead layer in approximately

a) 2 b) 5 c) 3 d) 1

136. Water will boil at 101.5 at which of the following pressure?

a) 76 cm of Hg b) 76 mm of Hg c) > 76 cm of Hg d) < 76 cm of Hg

137. Depression in freezing point is 6 K for NaCl solution if for water is 1.86 K/kg mol, amount of NaCl dissolved in 1 kg water is

a) 3.42 b) 1.62 c) 3.24 d) 1.71

138. The density of a 3.60 M sulphuric acid solution that is 29% by mass will be

a) 1.64 b) 1.88 c) 1.22 d) 1.45

139. The vapour pressure (VP) of a dilute solution of non-volatile solute is and the VP of pure solvent is , the lowering of the VP is :

a) +ve b) ⎯ve c) d)

140. Vapour pressure ofat is 143 mm of Hg and 0.5 g of a non-volatile solute (mol. wt=65) is dissolved in . Find the vapour pressure of the solution. (Density of )

a) 94.39 mm b) 141.93 mm c) 134.44 mm d) 199.34 mm

141. How many gram of NaOH will be required to prepare 500 g solution containing 10% NaOH solution?

a) 100 g b) 50 g c) 0.5 g d) 5.0 g

142. Conc has a density of 1.98 g/mL and is 98% by weight. Its normality is

a) 19.6 N b) 29.6 N c) 39.6 N d) 49.6 N

143. The phenomenon in which cells are shrinked down if placed in hypertonic solution is called :

a) Plasmolysis b) Haemolysis c) Endosmosis d) None of these

144. Beckmann thermometer are used to measure :

a) Boiling point of the solution

b) Freezing point of the solution

c) Any temperature

d) Elevation in boiling point or depression in freezing point

145. molecules of urea are present in 100 mL of its solution. The concentration of urea solution is

(Avogadro constant,

a) 0.001 M b) 0.01 M c) 0.02 M d) 0.1 M

146. When a crystal of the solute is introduced into a super saturated solution of the solute :

a) The solute dissolves

b) The excess solute crystallizes out

c) The solution becomes unsaturated

d) The solution remains super saturated

147. The mole fraction of the solute in one modal aqueous solution is

a) 0.018 b) 0.027 c) 0.036 d) 0.048

148. Which of the following solutions will have the highest boiling point ?

a) Camphor b) Naphthalene c) Benzene d) Water

149. The normality of mixture obtained by mixing 100 mL of 0.2 M +

100 mL of 0.2 M NaOH is

a) The nature of gas b) The temperature

c) The nature of the solvent d) All of the above

150. When attraction between is more than that of and , the solution will show…..deviation from Raoult’s law

a) Positive b) Negative c) No d) Cannot predicted

151. A solution containing 4 g of polyvinyl chloride polymer in one litre of dioxane was found to have an osmotic pressure of atm at . The approximate molecular weight of the polymer is

a) b) c) d)

152. The solubility of a gas in water depends on :

a) Nature of the gas b) Temperature c) Pressure of the gas d) All of these

153. Which of the following is not a colligative property?

a) Optical activity b) Osmotic pressure

c) Depression of freezing point d) Elevation of boiling point

154. The freezing point depression of 0.001 m, is . If for water, is 1.86 K Kg , value of will be

a) 4 b) 3 c) 2 d) 1

155. The vapour pressure of benzene at a certain temperature is 640 mm of Hg. A non-volatile and non-electrolyte solid weighing 2.175 g is added to 39.08 g of benzene. If the vapour pressure of the solution is 600 mm of Hg, what is the molecular weight of solid substance?

a) 49.50 b) 59.60 c) 69.60 d) 79.82

156. For an aqueous solution, freezing point is . Elevation of the boiling point of the same solution is (kg and

a) b) c) d)

157. The partial pressure of ethane over a saturated solution containing g of ethane is 1 bar. If the solution contains g of ethane, the partial pressure of ethane will be :

a) 0.762 bar b) 1.762 bar c) 0.1 bar d) 0.2 bar

158. The vapour pressure of benzene at 90 is 1020 torr. A solution of 5 g of a solute in 58.5 g benzene has vapour pressure 990 torr. The molecular weight of the solute is :

a) 78.2 b) 178.2 c) 206.2 d) 220

159. The osmatic pressure of 0.4% urea solution is 1.66 atm. and that of a solutions of sugar of 3.42% is 2.46 atm. When both the solutions are mixed then the osmatic pressure of the resultant solution will be

a) 1.02 atm b) 2.06 atm c) 3.04 atm d) 0.02 atm

160. Vapour pressure of dilute aqueous solution of glucose is 750 mm of mercury at 373 K. The mole fraction of solute is

a) b) c) d)

161. The relative lowering of vapour pressure produced by dissolving 71.5 g of a substance in 1000 g of water is 0.00713. The molecular weight of the substance will be :

a) 180 b) 18.0 c) 342 d) 60

162. 5 L of a solution contains 25 mg of What is its concentration in ppm? (mol. wt. of is 100)

a) 25 b) 1 c) 5 d) 2500

163. Binary liquid solutions which exhibit negative deviations from Raoult’s law boil at temperature ….than the expected value :

a) Lower b) Higher c) Same d) Cannot be said

164. A substance will be deliquescent it its vapour pressure is :

a) Equal to the atmospheric pressure

b) Equal to that of water vapour in the air

c) Greater than that of water vapour in the air

d) Lesser than that of water vapour in the air

165. The distribution coefficient of in between and is 85 in favour of at 25. If solubility of in at is 0.33 g lin is ……..g .

a) 28.05 b) 30.05 c) 40.05 d) 26.05

166. 1.0 g of a non-electrolyte solute (molar mass 250 g ) was dissolved in 51.2 g of benzene. If the freezing point depression constant of benzene is 5.12 K kg , the lowering in freezing point will be :

a) 0.5 K b) 0.2 K c) 0.4 K d) 0.3 K

167. Which of the following concentration term is/are independent of temperature?

a) Molarity b) Molarity and mole fraction

c) Mole fraction and molality d) Molality and normality

168. An azeotropic mixture of two liquids has boiling point lower than either of them, when it

a) Shows a negative deviation from Raoult’s law b) Shows no deviation from Raoult’s law

c) Shows positive deviation from Raoult’s law d) Is saturated

169. The molal elevation constant for water is 0.52 K . The elevation caused in the boiling point of water by dissolving 0.25 mole of a non-volatile solute in 250 g of water will be :

a) b) c) d)

170. At benzene has a vapour pressure of 900 torr and toluene has a vapour pressure of 360 torr. What is the mole fraction of benzene in the mixture with toluene that will boil at at 1 atm pressure, benzene-toluene form an ideal solution?

a) 0.416 b) 0.588 c) 0.688 d) 0.740

171. Which one of the statements given below concerning properties of solutions, describes a colligative effect?

a) Vapour pressure of pure water decreases by the addition of nitric acid

b) Boiling point of pure water decreases by the addition of ethanol

c) Boiling point of pure benzene increases by the addition of toluene

d) Vapour pressure of pure benzene decreases by the addition of naphthalene

172. An example of a solution having liquid in gas is:

a) Moist air

b) Dry air

c) Au-Hg

d)

173. Which of the given solutions has highest osmotic pressure?

a) b) c) d)

174. At high altitude the boiling of water occurs at low temp. because :

a) Atmospheric pressure is low

b) Temperature is low

c) Atmospheric pressure is high

d) None of the above

175. If a 5.25% (wt./vol.) solution of a non-electrolyte is isotonic with 1.50% (wt./vol.) solution of urea, (mol-wt = 60) is the same solvent then the molecular weight of non-electrolyte is :

a) 210.0 b) 90.0 c) 115.0 d) 105

176. Which solution will have least vapour pressure?

a) b) c) d)

177. The phenomenon in which cells are swelled up and then burst if placed in hypotonic solution is called :

a) Plasmolysis b) Haemolysis c) Exosmosis d) None of these

178. If 117 g NaCl is dissolved in 1000 g of water the concentration of the solution is said to be

a) 2 molar b) 2 molal c) 1 normal d) 1 molal

179. 0.1 molal aqueous solution of freezes at at atmospheric pressure for water is . The percentage of dissociation of the salt in solution is

a) 90 b) 80 c) 58 d) 98

180. Increasing the temperature of an aqueous solution will cause

a) Decrease in molarity b) Decrease in molarity

c) Decrease in mole fraction d) Decrease in %

181. The vapour pressure of two liquids and are 80 torr and 60 torr respectively. The total vapour pressure obtained by mixing 3 mole of and 2 mole of would be :

a) 68 torr b) 20 torr c) 140 torr d) 72 torr

182. The molal boiling point constant of water is When 2 mole of glucose are dissolved in 4000 g of water, the solution will boil at :

a) b) c) d)

183. One mole of non-volatile solute is dissolved in two mole of water. The vapour pressure of the solution relative to that of water is :

a) 2/3 b) 1/3 c) 1/2 d) 3/2

184. The for between and is 588 in favour of One litre of aqueous solution containing 1 g of is shaken with 50 mL of . What will be the amount of in aqueous layer?

a) 0.035 g b) 0.010 g c) 0.05 g d) 0.04 g

185. How many grams of dibasic acid (mol. wt. 200) should be present in 100 mL of the aqueous solution to give 0.1 N?

a) 10 g b) 20 g c) 2 g d) 1 g

186. The vapour pressure of a dilute solution is not influenced by :

a) Temperature of solution

b) Melting point of solute

c) Mole fraction of solute

d) Degree of dissociation of solute

187. 35.4 mL of HCl is required for the neutralisation of a solution containing 0.275 g of sodium hydroxide. The normality of hydrochloric acid is

a) 0.97 N b) 0.142 N c) 0.194 N d) 0.244 N

188. Molal elevation constant of a liquid is :

a) The elevent in b.p. which would be produced by dissolving one mole of solute in 100 g of solvent

b) The elevation of b.p. which would be produced by dissolving 1 mole solute in 10 g of solvent.

c) Elevation in b.p. which would be produced by dissolving 1 mole of solute in 1000 g of solvent

d) None of the above

189. The solubility of gas in liquid depends upon :

a) Nature of gas

b) Nature of solvent

c) Temperature and pressure

d) All of the above

190. Relative lowering of vapour pressure of a dilute solution is 0.2. What is the mole fraction of the non-volatile solute ?

a) 0.8 b) 0.5 c) 0.3 d) 0.2

191. If 0.1 M solutions of each electrolyte are taken and if all electrolytes are completely dissociated, then whose boiling point will be highest ?

a) Glucose b) KCl c) d)

192. *A* and *B* ideal gases. The molecular weights of *A* and *B* are in the ratio of 1:4. The pressure of a gas mixture containing equal weight of *A* and *B* is *p* atm. What is the partial pressure (in atm) of *B* in the mixture?

a) b) c) d)

193. What amount of water is added in 40 mL of NaOH (0.1 N) which is neutralised by 50 mL of HCl (0.2 N)?

a) 80 mL b) 60 mL c) 40 mL d) 90 mL

194. The amount of ice that will separate out on cooling a solute containing 50 g of ethylene glycol in 200 g water to will be

a) 8.37 g b) 161.3 g c) 3.87 g d) 38.7 g

195. The freezing point depression constant for water is If 5.00 g is dissolved in 45.0 g , the freezing point is change by Calculate the van’t Hoff factor for .

a) 0.381 b) 2.05 c) 2.63 d) 3.11

196. At, the vapour pressure of pure liquid ‘*A*’ is 520 mm Hg and that of pure liquid ‘*B*’ is 1000 mm Hg. If a mixture solution of ‘*A*’ and ‘*B*’ boils at and 1 atm pressure, the amount of ‘*A*’ in the mixture is

(1 atm = 760 mm Hg)

a) 52 mole per cent b) 34 mole per cent c) 48 mole per cent d) 50 mole per cent

197. The elevation of boiling point method is used for the determination of molecular weight of:

a) Non-volatile and soluble solute

b) Non-volatile and insoluble solute

c) Volatile and soluble solute

d) Volatile and insoluble solute

198. What is the freezing point of a solution containing 8.1 g HBr in 100 g water assuming the acid to be 90% ionised? ()

a) 0.85 b) -3.53 c) 0 d) -0.35

199. Equimolal solutions will have the same boiling point, provided they do not show :

a) Electrolysis

b) Association

c) Dissociation

d) Association or dissociation

200. Volume of 0.1 M required to oxidise 35 mL of 0.5 M solution is

a) 29.2 mL b) 17.5 mL c) 175 mL d) 145 mL

**Time :** 08:35:00 **CHEMISTRY**

**Marks :** 2060

2.SOLUTIONS

|  |
| --- |
| **: ANSWER KEY :** |

|  |
| --- |
| **1) b 2) d 3) a 4) d**  **5) d 6) d 7) a 8) c**  **9) a 10) c 11) a 12) b**  **13) a 14) a 15) c 16) a**  **17) c 18) a 19) a 20) a**  **21) d 22) c 23) a 24) a**  **25) b 26) c 27) c 28) d**  **29) a 30) c 31) b 32) b**  **33) b 34) b 35) c 36) d**  **37) d 38) a 39) b 40) d**  **41) b 42) b 43) b 44) d**  **45) a 46) c 47) c 48) c**  **49) c 50) a 51) b 52) c**  **53) a 54) c 55) d 56) b**  **57) b 58) b 59) d 60) a**  **61) d 62) a 63) d 64) d**  **65) b 66) d 67) a 68) b**  **69) a 70) b 71) b 72) c**  **73) d 74) a 75) b 76) c**  **77) a 78) c 79) b 80) b**  **81) a 82) d 83) b 84) b**  **85) c 86) a 87) c 88) b**  **89) c 90) b 91) d 92) a**  **93) c 94) d 95) d 96) b**  **97) a 98) a 99) a 100) d**  **101) c 102) d 103) b 104) c**  **105) a 106) c 107) b 108) c**  **109) a 110) c 111) b 112) a**  **113) d 114) b 115) c 116) d**  **117) c 118) b 119) d 120) a**  **121) a 122) b 123) a 124) a**  **125) d 126) c 127) a 128) c**  **129) b 130) d 131) c 132) b**  **133) b 134) a 135) c 136) c**  **137) b 138) c 139) a 140) b**  **141) b 142) c 143) a 144) d**  **145) b 146) b 147) a 148) a**  **149) d 150) b 151) b 152) d**  **153) a 154) b 155) c 156) b**  **157) a 158) d 159) b 160) a**  **161) a 162) c 163) b 164) d**  **165) a 166) c 167) c 168) c**  **169) c 170) d 171) a 172) a**  **173) a 174) a 175) a 176) d**  **177) b 178) b 179) b 180) a**  **181) d 182) c 183) a 184) a**  **185) d 186) b 187) c 188) c**  **189) d 190) d 191) d 192) a**  **193) b 194) d 195) c 196) d**  **197) a 198) b 199) d 200) a** |