NEET UG (2024) Chemistry Quiz-1

SECTION - A

- **51.** Law of conservation of mass is applicable in:
 - (1) Physical Change (2) Chemical reaction
 - (3) Nuclear reaction (4) Both(1) and (2)

52. Colligative properties of a solution depends upon:

- (1) Nature of both solvent and solute.
- (2) Nature of solute only.
- (3) Number of solvent particles.
- (4) Number of solute particles.
- **53.** The number of significant figures in 0.0699 is:
- **54.** According to Raoult's law, the relative lowering of vapour pressure for a solution is equal to:
 - (1) χ_{solvent} (2) χ_{solute}
 - (3) n_{solute} (4) $n_{solvent}$
- **55.** Calculate number of moles in 50 g of CaCO₃? (Gram molecular mass of CaCO₃ = 100 g)
 - (1) 1 mol (2) 0.5 mol
 - (3) 0.25 mol (4) 15 mol
- **56.** The value of Henry's law constant:
 - (1) Increases with increase in temperature.
 - (2) Decreases with increase in temperature
 - (3) Increases with decrease in temperature.
 - (4) Independent of temperature and depend only on pressure.
- **57.** A pure substance which contains only one type of atom is called
 - (1) an element (2) a compound
 - (3) a solid (4) a liquid
- **58.** Which of the following is not a characteristic of ideal solution?

(1)	$\Delta V_{mix} = 0$	(2)	$\Delta S_{mix} = +ve$
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- (3) $\Delta H_{\text{mix}} = 0$ (4) $\Delta G_{\text{mix}} = +ve$
- **59.** Which mode of expressing concentration is independent of temperature?
 - (1) Molality (2) Percent by mass
 - (3) Mole fraction (4) All of these
- **60.** A membrane which allows the movement of only solvent particles through it is called:
 - (1) Animal membrane
 - (2) Plant membrane
 - (3) Semipermeable membrane
 - (4) Permeable membrane

- **61.** According to Dalton, the smallest particle of matter which is indivisible, is called:
 - (1) Molecule (2) Atom
 - (3) Compound (4) lon
- **62.** Vapour pressure of a solvent containing non-volatile solute is:
 - (1) More than the vapour pressure of a solvent.
 - (2) Less than the vapour pressure of solvent
 - (3) Equal to the vapour pressure of solvent.
 - (4) None of these
- 63. Calculate molecular mass of HNO_3 ? (Atomic mass of H = 1 u, N = 14 u, O = 16 u)
 - (1) 60 u (2) 63 u
 - (3) 80 u (4) None of these
- 64. 10 g of a non-volatile solute when dissolved in 100 g benzene raises its boiling point by 1°C. Molar mass of the solute is:
 - (K_b for benzene = 2.53 K kg/mol)
 - (1) 25 g/mol (2) 253 g/mol
 - (3) 44 g/mol (4) 180 g/mol
- 65. What does the unit mol/Kg represent?
 - (1) Molality (2) Molarity
 - (3) Mole Fraction (4) Density
- **66.** The relative lowering of vapour pressure is equal to the mole fraction of the non-volatile solute. This statement was given by:
 - (1) Raoult (2) Henry
 - (3) Joule (4) Dalton
- **67.** According to the Avogadro's Law, equal volumes of two different gases, under same conditions of temperature and pressure, contain equal number of:
 - (1) Atoms (2) Molecules
 - (3) Electrons (4) Protons
- **68.** A solution of acetone in ethanol:
 - (1) shows positive deviation from Raoult's law.
 - (2) shows negative deviation from Raoult's law.
 - (3) obeys Raoult's law.
 - (4) behaves like an ideal solution.
- **69.** Which of the following is a chemical fertilizer?
 - (1) Urea
 - (2) Sodium Nitrate
 - (3) Ammonium sulphate
 - (4) All of these

- **70.** Among the colligative properties of solution, which one is the best method for the determination of molecular masses of proteins and polymers?
 - (1) Osmotic pressure
 - (2) Lowering in vapour pressure
 - (3) Lowering in freezing point
 - (4) Elevation in boiling point
- **71.** Physical states of a matter in three vessels I, II, III respectively are

	0 0 0 0 0	00000 00000 00000 00000	00000000 00000000 00000000 00000000 0000
	(I)	(II)	(III)
	(I)	(II)	(III)
(1)	Liquid	Gas	Solid
(2)	Liquid	Solic	d Gas
(3)	Gas	Liqu	id Solid
(4)	Gas	Solic	d Liquid

- **72.** The vapour pressure of two liquids A and B are 135 and 171 torr respectively. The total vapour pressure of solution obtained by mixing 6 moles of A and 3 moles of B would be:
 - (1) 147 torr (2) 95 torr
 - (3) 174 torr (4) 153 torr
- **73.** How many protons are present in Cl^{-} ion?

(1) 17 (2) 10	(1)	17		(2)	18
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- (3) 35 (4) 19
- **74.** The solution having lesser value of osmotic pressure is called:
 - (1) Hypotonic solution
 - (2) Hypertonic solution
 - (3) Isotonic solution
 - (4) All of the these
- **75.** The volume occupied by 4.4 g of CO_2 at STP is: (Gram molecular mass of $CO_2 = 44$ g)
 - (1) 22.4 L (2) 44.8 L
 - (3) 11.2 L (4) 2.24 L
- **76.** The ebullioscopic constant of a liquid solvent is the elevation of boiling point of:
 - (1) one molar solution of non-volatile and nonelectrolyte solute in it.
 - (2) one normal solution of non-volatile and nonelectrolyte solute in it.
 - (3) one formal solution of non-volatile and nonelectrolyte solute in it.
 - (4) one molal solution of non-volatile and nonelectrolyte solute in it.

- **77.** Calculate the mole fraction of Ethanol, if 3 moles of ethanol are dissolved in 7 moles of water:
 - (1) 0.7(2) 0.6(3) 0.3(4) 0.43
- **78.** Which of the following is not a binary solution?
 - (1) Pure water + Sugar
 - (2) Air
 - (3) Mixture of benzene and toluene
 - (4) Mixture of ethanol and methanol
- **79.** The number of moles of Ca(HCO₃)₂ required to prepare 1.50 moles of CO₂, according to the equation, Ca(HCO₃)₂ + 2HCl \rightarrow CaCl₂ + 2CO₂ + 2H₂O is:
 - (1) 1.00 mol (2) 2.00 mol
 - (3) 0.750 mol (4) 1.50 mol
- **80.** Fishes feel uncomfortable in warm water due to:
 - (1) fishes do not like warmness.
 - (2) higher amount of impurities.
 - (3) low solubility of oxygen at higher temperature.
 - (4) greater population of fishes.
- 81. The atomic number of an element represents:
 - (1) Number of neutrons in the nucleus.
 - (2) Number of protons in the nucleus.
 - (3) Atomic weight of element.
 - (4) Valency of element.
- **82.** Formation of CO and CO₂ illustrates the ...
 - (1) Law of conservation of mass
 - (2) Law of Reciprocal proportion
 - (3) Law of constant Proportion
 - (4) Law of Multiple proportion
- 83. Calculate the normality of $0.0521 \text{ M H}_3\text{PO}_4$.
 - (1) 0.0521 N (2) 0.1042 N (3) 0.1563 N (4) 0.0173 N
- 84. Equal moles of N₂ and H₂ react to form ammonia under suitable conditions. The limiting reagent is: $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$
 - (1) H_2 (2) N_2
 - (3) NH_3 (4) H_2 and N_2 both
- **85.** Calculate the number of moles in 0.12 mg of acetic acid (CH₃COOH).

(Gram molecular mass of $CH_3COOH = 60 \text{ g}$)

- (1) 2×10^{-6} mole
- (2) 2×10^{-5} mole
- (3) 2×10^{-3} mole
- (4) 2 mole

SECTION - B

86. Statement I: Sum of mole fraction of all the components in a mixture is 1.

Statement II: Mole fraction is a temperature dependent mode of concentration.

- (1) Statement I and Statement II both are incorrect.
- (2) Statement I and Statement II both are correct.
- (3) Statement I is correct but statement II is incorrect.
- (4) Statement I is incorrect but statement II is correct.
- **87.** A solution which is ideal in nature follows:
 - (1) Graham's Law (2) Ostwald Law
 - (3) Fleming's Law (4) Raoult's Law
- **88.** A sample of toothpaste weighing 500 g, on analysis was found to contain 0.2 g of fluorine. The concentration of fluorine is:
 - (1) 4×10^2 ppm (2) 4×10^1 ppm
 - (3) 4×10^3 ppm (4) 2×10^2 ppm
- **89.** A solution which boils at constant temperature is called:
 - (1) Azeotrope (2) Ideal solution
 - (3) Saline water (4) Alkaline solution
- **90.** In one molal solution that contains 0.5 mole of a solute, there is:
 - (1) 100 ml of solvent
 - (2) 1000 g of solvent
 - (3) 500 g of solvent
 - (4) 500 ml of solvent
- **91.** 1 M, 2.5 litre NaOH solution is mixed with another 0.5 M, 3 litre NaOH solution. Then find out the molarity of resultant solution.

(1)	0.73 M	(2)	0.50 M
(3)	0.80 M	(4)	1.0 M

92. Find elevation in boiling point of a solution obtained by dissolving 90 g of glucose in 200 g of water. (K_b of H₂O = 0.52 K kg/mol, gram molecular mass of glucose = 180 g)

(1)	2.6 K	(2)	5.3 K
(3)	1.3 K	(4)	4.2 K

93. SI unit of pressure is:

(1)	Bar	(2	2)	Atmospheric
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- (3) Pascal (4) Torr
- **94.** At 25°C, the highest osmotic pressure is exhibited by 0.1 M solution of:
 - (1) Urea (2) Glucose (2) KGI
 - (3) KCl (4) CaCl₂

95. The vapour pressure of water at 20°C is

17.54 mm of Hg. When 20 g of a non-ionic, substance is dissolved in 100 g of water, the vapour pressure is lowered by 0.30 mm of Hg. What is the molecular mass of the substance? (Gram molecular mass of water = 18 g)

(1)	200.8	(2)	206.8
(3)	210.5	(4)	215.2

96. Statement I: 10 ml of a liquid A is mixed with 20 ml of liquid B, total volume of the solution is 30 ml.

Statement II: Liquid A and liquid B will form an ideal solution.

- (1) Statement I is true but statement II is false
- (2) Statement II is true but statement I is false
- (3) Statement I and statement II is both are false
- (4) Statement I and II both are true and statement II is the correct explanation of statement I.
- 97. In the reaction,

$$\begin{split} 4NH_3(g) + 5O_2(g) &\rightarrow 4NO(g) + 6H_2O(\ \ell\) \\ When \ 1 \ mol \ of \ ammonia \ and \ 1 \ mol \ of \ O_2 \ are \ made \\ to \ react \ to \ completion \ then \end{split}$$

- (1) 1.0 mol of H_2O is produced
- (2) 1.0 mol of NO will be produced
- (3) all the oxygen will be consumed
- (4) all the ammonia will be consumed
- $98. \quad SO_2 + 2H_2S \rightarrow 3S + 2H_2O$

2 mol of H_2S and 11.2 L SO₂ at NTP react to form x mol of sulphur. x is:

- (1) 1.5 (2) 3
- (3) 11.2 (4) 6
- **99.** If 1 mole of a non-volatile and non-electrolyte solute in 1000 g of water depresses the freezing point by 1.86°C, then what will be the freezing point of solution of 1 mole of the solute in 500 g of water?
 - (1) -0.93°C
 - (2) -1.86°C
 - (3) 3.72°C
 - (4) -3.72°C
- **100.** If H_2SO_4 ionises as,

 $H_2SO_4 + 2H_2O \rightarrow 2H_3O^+ + SO_4^{2-}$.

Then total number of ions produced by 0.1 mol H_2SO_4 will be:

- (1) 9.03×10^{21}
- (2) 3.01×10^{22}
- (3) 6.02×10^{22}
- (4) 1.8×10^{23}

Solution

51. (4)

Law of conservation of mass is applicable for all physical changes and chemical reaction except only nuclear reactions. (NCERT – Page 14)

52. (4)

The properties of solution which depends only on the number of solute particles but not on the nature of the solute taken are called colligative properties. (NCERT – Page 15)

53. (3)

Significant figures are meaningful digits which are known with certainty. Zeroes after the number are significant but before the number non- significant. So, the number of significant figures in 0.0699 is 3. (NCERT – Page 12)

54. (2)

According to Raoult's law, the relative lowering of vapour pressure for a solution is equal to mole fraction of solute (χ_{solute})

 $\frac{P^{\circ}-Ps}{P^{\circ}} = \chi_{solute}$ (NCERT – Page 15 – 16)

55. (2)

Molar mass of $CaCO_3 = Gram$ molecular mass of $CaCO_3$

Number of moles of $CaCO_3 = Given mass/Molar mass$ Number of moles of $CaCO_3 = 50/100 = 0.5$ (NCERT – Page 18)

56. (1)

 $K_{H}\ increases,\ on\ increasing\ temperature.$ (NCERT – Page 7)

57. (1)

An element is made up of only one type of atom. (NCERT – Page 5)

58. (4)

An ideal solution is the solution which obeys Raoult's law exactly over entire range of concentration. Such solutions are formed by mixing the two components which are identical in molecular size, in structure and have almost identical intermolecular forces.

It must obey Raoult's law.

The enthalpy of mixing should be zero.

The volume of mixing should be zero. $\Delta S_{mix} = +ve$ $\Delta G_{mix} = -ve$ (NCERT – Page 13)

59. (4)

The terms which includes volume will be temperature dependent otherwise all are temperature independent as,

mass of solute $\times 1000$

 $Molality = \frac{11000}{\text{molar mass of solute } \times 1000}$

i.e., independent of temperature.

Mole fraction: The ratio of the number of moles of one component to the total number of all the components present in the solution, is called the mole fraction of that component.

Percentage by mass: The number of grams of solute dissolved in one gram of solution is called mass fraction of the solute.

So, all are temperature independent.

(NCERT – Page 23 – 24)

60. (3)

Semipermeable membranes are those which allow the solvents. Such as water, pass through them. (NCERT – Page 20 - 21)

61. (2)

According to Dalton, the smallest particle of matter which is indivisible, is called an atom. (NCERT – Page 16)

62. (2)

At any given temperature, the vapor pressure of a solution containing a non-volatile solute is less than that of the pure solvent. This effect is called vapor pressure lowering. (NCERT – Page 15)

63. (2)

Molecular mass of $HNO_3 = Mass$ of H atom + mass of nitrogen atom + 3 (mass of oxygen atom) Molecular mass of $HNO_3 = 1 + 14 + 48 = 63$ u (NCERT – Page 17)

64. (2)

$$\Delta T_{b} = i \times k_{b} \times m$$

$$1 = 1 \times 2.53 \times \left\{ \frac{\frac{10}{M} \text{ mol}}{\frac{100}{1000} \text{ kg}} \right\}$$

$$\Rightarrow M = 253 \text{ g / mol}$$
(NCERT - Page 17)

65. (1)

Molality is a measure of the number of moles of solute in a solution corresponding to 1 kg of solvent.

(NCERT – Page 24)

66. (1)

The relative lowering of vapour pressure is equal to the mole fraction of the non-volatile solute. This statement was given by Raoult. (NCERT – Page 15)

67. (2)

Avogadro's Law states that equal volumes of two different gases, under the same conditions of temperature and pressure, contain an equal number of molecules.

(NCERT - Page 15 - 16)

68. (1)

A solution of acetone (CH₃COCH₃) in ethanol (C₂H₅OH) is a non-ideal solution and shows positive deviation from Raoult's law. (NCERT – Page 13)

69. (4)

Urea, sodium nitrate and ammonium sulphate are chemical fertilizer. (NCERT – Page 4)

70. (1)

As compared to other colligative properties, the magnitude of osmotic pressure is large even for very dilute solutions. Biomolecules are generally not stable at higher temperature and polymers have poor solubility. The osmotic pressure method has an advantage because the pressure measurement is around room temperature. (NCERT – Page 20 - 22)

71. (3)

(I) is gas, (II) is liquid and (III) is solid. (NCERT – Page 4 – 5)

72. (1)

From Raoult's law, vapour pressure of the solution;

 $P_{S} = P_{A}^{0}\chi_{A} + P_{B}^{0}\chi_{B}$ $= 135 \times \frac{6}{9} + 171 \times \frac{3}{9}$ = 90 + 57= 147 torr(NCERT - Page 9 - 10)

73. (1)

Number of protons always equal to atomic number (Z)

Hence, protons in $C\Gamma = 17$ (NCERT – Page 16)

74. (1)

A solution having lesser osmotic pressure than some other solution is said to be called hypotomic solution. (NCERT – Page 22)

75. (4)

Number of moles of $CO_2 = mass / molar mass$ Number of moles of $CO_2 = 4.4/44 = 0.1$ mol Volume = $0.1 \times 22.4 = 2.24$ L. (NCERT – Page 18)

76. (4)

The ebullioscopic constant of a liquid solvent is the elevation of boiling point of one molal solution of non-volatile and non-electrolyte solute in it.

(NCERT-Page 17)

77. (3)

Mole fraction of ethanol can be calculated as, Mole fraction of ethanol

Number of moles of ethanol

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Number of moles of ethanol + Number of moles of water
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Mole fraction of ethanol $=\frac{3}{3+7}=\frac{3}{10}=0.3$

(NCERT - Page 23)

78. (2)

Air is not a binary solution. (NCERT – Page 18)

79. (3)

Ca(HCO₃)₂ + 2HCl \rightarrow CaCl₂ + 2CO₂ + 2H₂O According to stoichiometry of the reaction, 1 moles of Ca(HCO₃)₂ react with 2 moles of HCl to form 1 mole of CaCl₂, 2 moles of CO₂ and 2 moles of H₂O. So, 2 moles of CO₂ formed by = 1 mole of Ca(HCO₃)₂.

So, 1.50 moles of CO_2 formed by = 0.750 mole of Ca(HCO₃)₂.

(NCERT – Page 1)

80. (3)

The amount of dissolved oxygen in water decreases with rise in the water's temperature. Cold water has more dissolved oxygen per unit area than warm water. So, Fishes feel uncomfortable in warm water (NCERT – Page 8 - 9)

81. (2)

Atomic number of an element represents the number of protons in the nucleus. It is also equal to the number of electrons in neutral atom. The number of neutrons is equal to the difference between mass number and atomic number. (NCERT – Page 16)

82. (4)

If an element forms more than one compound with another element for a given mass of an element, masses of other elements are in the ratio of small whole numbers. Formation of CO and CO_2 illustrates the Law of Multiple Proportion. (NCERT – Page 15)

83. (3)

In phosphoric acid (H₃PO₄), no. of H⁺ ions it produces on dissociation per molecule of acid is 3. Hence the n-factor for phosphoric acid H₃PO₄ is 3. So, Normality = Molarity \times n-factor = 0.0521 \times 3 = 0.1563 N. (NCERT – Page 23)

84. (1)

Let the moles of $N_2 = H_2 = 1 \mod Balanced reaction is:$ $<math>N_2 + 3H_2 \rightarrow 2NH_3$ From equation: 1 mol 3 mol Given 1 mol 1 mol Now from the equation; 1 mol of N_2 consumes 3 mol H_2 But given H_2 is only 1 mole which will be consumed totally in the reaction. Thus, limiting reagent is H_2 . (NCERT – Page 20 – 21)

85. (1)

 $0.12 \text{mg} = 0.12 \times 10^{-3} \text{ g} = 12 \times 10^{-5} \text{ g}$ $n_{\text{CH}_3\text{COOH}} = \frac{\text{Given mass in g}}{\text{Molar mass of CH}_3\text{COOH}}$ $= \frac{12 \times 10^{-5} \text{ g}}{60 \text{ g / mol}}$ $= \frac{1 \times 10^{-5}}{5} \text{ mol}$

 $= 0.2 \times 10^{-5} \text{ mol}$ $= 2 \times 10^{-6} \text{ mol}$ (NCERT - Page 18)

86. (3)

Sum of mole fraction of all components in a mixture is 1. (Correct) Mole fraction is a temperature independent mode of concentration. (NCERT – Page 23)

87. (4)

A solution which is ideal in nature follows Raoult's Law. (NCERT – Page 13)

88. (1)

$$ppm = \frac{W_{solute}}{W_{solution}} \times 10^{6}$$
$$= \frac{0.2}{500} \times 10^{6}$$
$$= 0.0004 \times 10^{6}$$
$$= 4 \times 10^{-4} \times 10^{6}$$
$$= 4 \times 10^{2} ppm$$
(NCERT - Page 3)

89. (1)

An Azeotrope is a special type of liquid-liquid mixture which boils at constant temperature at a certain composition. (NCERT – Page 14)

90. (3)

Molality =
$$\frac{n_{solute}}{W_{kg} \text{ solvent}}$$

 $1 = \frac{0.5}{W}$
= 0.5 kg = 500 g
(NCERT – Page 24)

91. (1)

$$M_{3} = \frac{M_{1} V_{1} + M_{2} V_{2}}{V_{1} + V_{2}}$$
$$= \frac{1 \times 2.5 + 0.5 \times 3}{2.5 + 3}$$
$$= \frac{4}{5.5}$$
$$= 0.727$$
$$= 0.73 M$$
(NCERT - Page 23)

92. (3) $\Delta T_b = i \times K_b \times m$ i = 1 (for non-electrolyte (glucose)) $K_b = 0.52 \text{ K kg/mol}$ $m = \frac{\text{no. of moles of solute}}{\text{mass of solvent (gram)}} \times 1000$ $m = \frac{90}{180} \times 1000$ 200 $m=\frac{90\times1000}{180\times200}$ m=2.5 mol/kg $\Delta T_b = 1 \times 0.52 \times 2.5$ $\Delta T_{\rm b} = 1.3 \text{ K}$ (NCERT - Page 17)

93. (3)

SI unit of pressure is Pascal. (NCERT – Page 7)

94. (4)

Osmotic pressure is a colligative property i.e., depends only upon the number of particles or ions in solution. More the number of ions in solution, more will be the osmotic pressure of solution.

(i) 0.1 M urea and 0.1 M glucose will have same number of molecules in solution as they do not ionise.

- (ii) $KCl \rightarrow K^+ + Cl^- (2 \text{ ions})$ $CaCl_2 \rightarrow Ca^{2+} + 2Cl^{-} (3 \text{ ions})$
- CaCl₂ produces maximum number of ions. *.*..
- It will have highest osmotic pressure. *.*..

$$(\pi = iCRT)$$

(NCERT – Page 21)

95. (2)

$$\frac{p^{0} - p_{s}}{p_{s}} = \frac{w_{B}}{M_{B}} \times \frac{M_{A}}{w_{A}}$$
$$\frac{0.30}{17.24} = \frac{20}{M_{B}} \times \frac{18}{100}$$
$$\Rightarrow M_{B} = \frac{20 \times 18 \times 17.24}{0.30 \times 100} = 206.88$$
(NCERT - Page 16)

96. (4)

Statement I: 10 ml of a liquid A is mixed with 20 ml of liquid B, total volume of the solution is 30 ml. (True).

Statement II: Liquid A and liquid B will form an ideal solution. (True)

For an ideal solution, $\Delta V_{mix} = 0$

Hence, Statement I and II both are true and Statement II is the correct explanation of Statement II. (NCERT - Page 13)

97. (3)

 $4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$ 4 moles of NH₃ require 5 moles of O₂ 1 mole of NH₃ will require = $\frac{5}{4}$ mole of O₂ But given $O_2 \Rightarrow 1 \mod 1$ \Rightarrow O₂ is limiting Reagent 5 mole $O_2 \rightarrow 6$ mole H_2O 1 mole $O_2 \rightarrow \frac{6}{r}$ mole H₂O 1 mole $O_2 \rightarrow \frac{4}{5}$ mole NO (NCERT - Page 20 - 21)

98. (1)

 $\underset{1\,\text{mol}\,SO_2}{\text{SO}_2} + \underset{2\,\text{mol}\,H_2\,S}{2\text{H}_2} \xrightarrow{3} \underset{S}{3\text{mol}} \xrightarrow{3} \underset{S}{\text{H}_2O}$ $22.4LSO_2$ 2mol H₂S 3mol S 11.2L SO₂ 1mol H₂S $\frac{3}{2}$ mol S $x = \frac{3}{2} = 1.5$ (NCERT – Page 20 – 21)

99. (4)

$$\Delta T_{f} = K_{f} \cdot m$$
$$1.86 = K_{f} \cdot \frac{1}{1}$$

For solution of 1 mole of the solute in 500 g of water;

$$\Delta T_{f} = K_{f} \cdot \frac{1}{0.5}$$

$$\Delta T_{f} = 1.86 \cdot \frac{1}{0.5}$$

$$\therefore \quad \text{Required } \Delta T_{f} = 3.72^{\circ} \text{C}$$

$$\Rightarrow \text{Freezing point } = -3.72^{\circ} \text{C}$$

(NCERT - Page 18 - 19)

100. (4)

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 $H_2SO_4 + 2H_2O \rightarrow 2H_3O^+ + SO_4^{2-}$ 1 mole $H_2SO_4 \rightarrow 3$ moles of ions \Rightarrow 1 molecule H₂SO₄ \rightarrow 3 ions \Rightarrow 0.1 mol H₂SO₄ = 0.1 × N_A × 3 ions of H₂SO₄ 0.1 N_A molecules \rightarrow 0.1 × N_A × 3 ions of H₂SO₄ $= 0.1 \times 6.022 \times 10^{23} \times 3$ $= 1.8 \times 10^{23}$ (NCERT - Page 18)