

CET25C1 SOLUTIONS

Class 12 - Chemistry

Time Allowed: 1 hour and 30 minutes

Maximum Marks: 75

- Which among the following is an example of a solid solution in which the solute is a gas? [1]
 - Hydrated salts
 - Humidity in air
 - Pumice stone
 - Aerated drinks
- To neutralize completely 20 mL of 0.1 M aqueous solution of phosphorus acid (H_3PO_3) the volume of 0.1 M aqueous KOH solution required is [1]
 - 40 mL
 - 20 mL
 - 10 mL
 - 60 mL
- At equilibrium, the rate of dissolution of a solid solute in a volatile liquid solvent is _____. [1]
 - greater than the rate of crystallisation
 - less than the rate of crystallisation
 - zero
 - equal to the rate of crystallisation
- The use of pressure cooker reduces cooking time because it creates [1]
 - High pressure
 - Low pressure
 - Low temperature
 - High temperature
- If molality of a dilute solution is doubled, the value of the molal elevation constant (K_b) will be [1]
 - doubled
 - unchanged
 - halved
 - tripled
- In pressure cooker boiling point of water [1]
 - Sometimes increases and sometimes decreases
 - Decreases
 - Remain constant
 - Increases
- Liquid ammonia bottle is first cooled before opening because [1]
 - Vapour pressure increases on cooling
 - Vapour pressure Same on cooling
 - Vapour pressure decreases on cooling
 - Vapour pressure of liquid ammonia is very low at room temperature
- Normality of 0.3 M phosphoric acid is [1]
 - 0.9
 - 0.1
 - 0.6
 - 0.5
- Which among the following is soluble in water? [1]

- a) Phenol
b) Formic acid
c) Benzene
d) Chloroform

10. When blood cells are placed in pure water, blood cells [1]
a) Become white in colour
b) Shrinks
c) Diffuses in water
d) Swells up

11. Which among the following is an example of liquid in solid? [1]
a) Aerated drinks
b) Mercury in zinc
c) Sugar solution
d) Alloys

12. An azeotropic mixture of two liquids has a boiling point higher than either of the two liquids when it: [1]
a) obeys Raoult's law.
b) shows large positive deviation from Raoult's law.
c) shows no deviation from Raoult's law.
d) shows large negative deviation from Raoult's law.

13. An azeotropic mixture of two liquids will have a boiling point lower than either of the two liquids when it [1]
a) shows a positive deviation from Raoult's law
b) forms an ideal solution
c) is saturated
d) shows a negative deviation from Raoult's law

14. In comparison to a 0.01 M solution of glucose, the depression in freezing point of a 0.01 M MgCl_2 solution is [1]
_____.
a) about three times
b) about twice
c) about six times
d) the same

15. Ethylene glycol is added to water as antifreeze. It will [1]
a) Only decrease the freezing point of water
b) Only increase the boiling point of water
c) Decrease the freezing point of water in the winter and increase the boiling point of water in the summer.
d) It is used to clean the radiator in car

16. When the soda bottle is opened, some of the dissolved carbon dioxide gas escapes because of: [1]
a) to reach a new equilibrium condition required for the higher pressure.
b) difference in solubility of carbon dioxide at different pressures.
c) some of the undissolved carbon dioxide gas in the soda bottle.
d) difference in solubility of carbon dioxide at different temperatures.

17. Which among the following show positive deviation? [1]
a) Chloroform and benzene
b) Acetone and aniline
c) Hydrochloric acid and water
d) Acetone and ethanol

18. A cucumber placed in brine solution _____. [1]

- a) swells as it loses water due to reverse osmosis b) shrivels as it loses water due to osmosis
- c) shrivels as it absorbs water due to reverse osmosis d) swells as it absorbs water due to osmosis
19. The osmotic pressure of a solution containing 0.02 mole of solute at 300 K will be: [1]
- a) $0.02 \times 0.0821 \times 300 \text{ atm}$ b) $\frac{0.02 \times 300}{0.0821} \text{ atm}$
- c) $0.03 \times 0.821 \times 300 \text{ atm}$ d) $\frac{0.02 \times 0.0821}{300} \text{ atm}$
20. Which of the following colligative property is used to find the molar mass of proteins? [1]
- a) Depression in freezing point b) Osmotic pressure
- c) Elevation in boiling point d) Relative lowering of vapour pressure
21. Out of the following 1.0 M aqueous solutions, which one will show largest freezing point depression? [1]
- a) $\text{C}_6\text{H}_{12}\text{O}_6$ b) $\text{Al}_2(\text{SO}_4)_3$
- c) NaCl d) Na_2SO_4
22. For dissolution of gases in liquids, the concentration of a gas in a liquid is: [1]
- a) proportional to the vapour pressure of the gas b) lower to the pressure of the gas as compared to the liquid
- c) proportional to the pressure of the gas over the liquid d) equal to the pressure of the gas in relation to the liquid
23. The colligative property used for the determination of molar mass of polymers and proteins is: [1]
- a) Elevation in boiling point b) Depression in freezing point
- c) Osmotic pressure d) Relative lowering in vapour pressure
24. A compound undergoes complete tetramerization in a given organic solvent. The Van't Hoff factor i is: [1]
- a) 4 b) 2
- c) 0.25 d) 0.5
25. The value of Henry's constant K_H is _____. [1]
- a) greater for gases with lower solubility. b) constant for all gases.
- c) greater for gases with higher solubility. d) not related to the solubility of gases.
26. Which of the following formula represents Raoult's law for a solution containing non-volatile solute? [1]
- a) $p_{\text{solute}} = p_{\text{solute}}^0 \cdot x_{\text{solute}}$ b) $p = K_H \cdot x$
- c) $p_{\text{solute}} = p_{\text{solvent}}^0 \cdot x_{\text{solvent}}$ d) $P_{\text{Total}} = P_{\text{solvent}}$
27. Which of the following is **not** true about enantiomers? [1]
- a) They have the same specific rotation. b) They have the same chemical reactivity.
- c) They have the same density. d) They have the same melting or boiling point.
28. Greater the value of K_H , lower will be the [1]

- a) Pressure
b) Solubility
c) Concentration
d) Temperature
29. In which unit, the concentration of solution remains independent of temperature [1]
a) formality
b) normality
c) molality
d) molarity
30. The increase in the temperature of the aqueous solution will result in its: [1]
a) Molarity to decrease
b) Mass % to increase
c) Molarity to increase
d) Mole fraction to increase
31. Isotonic solutions have same _____. [1]
a) vapour pressure
b) boiling temperature
c) osmotic pressure
d) freezing temperature
32. 4L of 0.02 M aqueous solution of NaCl was diluted by adding one litre of water. The molarity of the resultant solution is _____. [1]
a) 0.016
b) 0.012
c) 0.008
d) 0.004
33. Which one of the following pairs will form an ideal solution? [1]
a) n-hexane and n-heptane
b) ethanol and acetone
c) phenol and aniline
d) chloroform and acetone
34. Which one of the following pairs will **not** form an ideal solution? [1]
a) Hexane and Heptane
b) Nitric acid and Water
c) Ethyl chloride and Ethyl bromide
d) Benzene and Toluene
35. Amount of NaOH required to neutralize 1.5 L of 0.1 N HCl [1]
a) 4 g
b) 6 g
c) 40 g
d) 60 g
36. An aqueous solution of methanol and water has vapour pressure [1]
a) Equal to that of water
b) More than that of water
c) Equal to that of methanol
d) Less than that of water
37. Which will form maximum boiling azeotrope? [1]
a) $C_2H_5OH + H_2O$
b) $H_3NO_2 + H_2O$
c) $HNO_3 + H_2O$
d) $C_6H_6 + C_6H_5CH_3$
38. The factor $\frac{\Delta T_f}{K_f}$ represents [1]
a) formality
b) molarity
c) normality
d) molality
39. Solubility of gas in liquid decreases with increase in [1]

- a) Pressure
c) Volume
- b) Number of solute molecules
d) Temperature
40. Which is not a colligative property? [1]
a) Lowering of vapour pressure
b) Freezing point
c) Elevation of boiling point
d) Osmotic pressure
41. Which of the following solutions has the highest boiling point at one atmospheric pressure? [1]
a) 0.1 M CaCl_2
b) 0.1 M Sucrose
c) 0.1 M NaCl
d) 0.1 M Glucose
42. Which of the following colligative properties is associated with the concentration term molarity? [1]
a) Osmotic pressure
b) Lowering of vap. pressure
c) Elevation in b.p.
d) Depression in f.p.
43. A solution showing a large positive deviation from ideal behaviour has [1]
a) ΔH_{mix} is positive
b) Lower boiling point than both the components and ΔH_{mix} is negative
c) Higher boiling point than both the components
d) ΔH_{mix} is Negative
44. K_H value for Ar(g) , $\text{CO}_2(\text{g})$, HCHO(g) and $\text{CH}_4(\text{g})$ are 40.39, 1.67, 1.83×10^{-5} and 0.413 respectively. [1]
Arrange these gases in the order of their increasing solubility.
a) $\text{Ar} < \text{CH}_4 < \text{CO}_2 < \text{HCHO}$
b) $\text{HCHO} < \text{CO}_2 < \text{CH}_4 < \text{Ar}$
c) $\text{Ar} < \text{CO}_2 < \text{CH}_4 < \text{HCHO}$
d) $\text{HCHO} < \text{CH}_4 < \text{CO}_2 < \text{Ar}$
45. A compound undergoes complete dimerization in a given organic solvent. The Van't Hoff factor i is: [1]
a) 0.5
b) 5
c) 1
d) 2
46. On dissolving ammonium chloride in water at room temperature, the solution feels cool to touch. Under which [1]
of the following conditions does salt dissolve faster?
a) Salt crystals in cold water
b) Powdered salt in cold water
c) Powdered salt in hot water
d) Salt crystals in hot water
47. Considering the formation, breaking and strength of hydrogen bond, predict which of the following mixtures [1]
will show a positive deviation from Raoult's law?
a) Chloroform and acetone.
b) Nitric acid and water.
c) Phenol and aniline.
d) Methanol and acetone.
48. 0.1 M solution of urea, at a given temperature, is isotonic with: [1]
a) 0.1 M glucose solution
b) 0.1 M BaCl_2 solution
c) 0.1 M NaCl solution
d) 0.02 M KCl solution
49. Which among the following form nearly ideal solutions? [1]

- a) Chloroform and benzene
b) Benzene and Toluene
c) Alcohol and water
d) Acetone and aniline

50. The depression in freezing point for 1M urea, 1 M glucose and 1 M NaCl are in the ratio of [1]
a) 1:1:2
b) 3:2:2
c) 1:1:1
d) 1:2:3

51. A compound undergoes complete tetramerization in a given organic solvent. The Van't Hoff factor i is: [1]
a) 4.0
b) 2.0
c) 0.25
d) 0.125

52. Mathematical expression relating molarity and molality is [1]
a) $\frac{\rho}{M} = \frac{1}{m} + \frac{\text{Mass of solute}}{1000}$
b) $\frac{\rho}{M} = \frac{1}{m} + \frac{\text{Mass of solution}}{1000}$
c) $\frac{M}{\rho} = \frac{1}{m} + \frac{\text{Mass of solute}}{1000}$
d) $\frac{\rho}{m} = \frac{1}{M} + \frac{\text{Mass of solvent}}{1000}$

53. Which among the following shows a negative deviation from Raoult's law? [1]
a) Acetone and chloroform
b) Acetone and benzene
c) Methyl alcohol and water
d) Carbon tetrachloride and chloroform

54. 25mL of a solution of barium hydroxide on titration with 0.1molar solution of hydrochloric acid give a titre value of 35mL. The molarity of Barium hydroxide solution is [1]
a) 0.14
b) 0.28
c) 0.07
d) 0.35

55. A beaker contains a solution of a substance 'A'. Precipitation of substance 'A' takes place when a small amount of 'A' is added to the solution. The solution is _____. [1]
a) supersaturated
b) unsaturated
c) concentrated
d) saturated

56. Which has highest freezing point at 1 atm? [1]
a) 0.1 molal sugar solution
b) 0.1 molal BaCl_2 solution
c) 0.1 molal NaCl solution
d) 0.1 molal FeCl_3 solution

57. Colligative properties depend on _____. [1]
a) the nature of the solute particles dissolved in solution.
b) the nature of solvent particles.
c) the number of solute particles in solution.
d) the physical properties of the solute particles dissolved in solution.

58. The plant cell will shrink when placed in: [1]
a) water
b) hypotonic solution
c) hypertonic solution
d) isotonic solution

59. A 500 g of tooth paste has 0.2 g of fluoride concentration. Fluorine concentration in terms of ppm is [1]
a) 250 b) 200
c) 1000 d) 400
60. A compound $\text{CaCl}_2 \cdot 6\text{H}_2\text{O}$ undergoes complete dissociation in water. The Van't Hoff factor i is: [1]
a) 6 b) 3
c) 4 d) 9
61. 1 mole of liquid A and 2 moles of liquid B make a solution having a total vapour pressure 40 torr. The vapour pressure of pure A and pure B are 45 torr and 30 torr respectively. The above solution [1]
a) is an ideal solution. b) shows negative deviation.
c) shows positive deviation. d) is a maximum boiling azeotrope.
62. The size of a raw mango shrinks to a much smaller size when kept in a concentrated salt solution. Which one of the following processes can explain this? [1]
a) Osmosis b) Reverse osmosis
c) Dialysis d) Diffusion
63. An unknown gas X is dissolved in water at 2.5 bar pressure and has mole fraction 0.04 in solution. The mole fraction of X gas when the pressure of gas is doubled at the same temperature is [1]
a) 0.08 b) 0.92
c) 0.04 d) 0.02
64. Which of the following has highest boiling point? [1]
a) 0.1 molal urea solution b) 0.1 molal NaCl solution
c) 0.1 molal BaCl_2 solution d) 0.1 molal sugar solution
65. Which of the following units is useful in relating the concentration of a solution with its vapour pressure? [1]
a) mole fraction b) parts per million
c) mass percentage d) molality
66. The temperature at which the vapour pressure of a liquid equals external pressure is called: [1]
a) m.p b) fp
c) critical temperature d) b.p
67. The isotonic solution have: [1]
a) same clinical properties b) different colligative properties
c) different osmotic pressure d) equimolar concentrations
68. Which of the following aqueous solution will have highest boiling point? [1]
a) 2.0 M K_2SO_4 b) 1.0 m K_2SO_4
c) 2.0 M KCl d) 1.0 M KCl
69. The tanks used by divers are filled with air diluted with [1]
a) Helium b) Argon

c) Nitrogen

d) Hydrogen

70. 50 mL of an aqueous solution of glucose C₆H₁₂O₆ (Molar mass: 180 g/mol) contains 6.02×10^{22} molecules. The concentration of the solution will be [1]
- a) 2.0 M b) 0.1 M
c) 1.0 M d) 0.2 M
71. Value of Henry's law constant K_H _____. [1]
- a) increases with increase in temperature. b) decreases with increase in temperature.
c) first increases then decreases. d) remains constant.
72. The boiling point of a solvent containing a non-volatile solute: [1]
- a) is disconsolate b) does not change
c) is elevated d) is depressed
73. Low concentration of oxygen in the blood and tissues of people living at high altitude is due to : [1]
- a) low atmospheric pressure b) low temperature
c) both low temperature and high atmospheric pressure d) high atmospheric pressure
74. The unit of Ebullioscopic constant is _____. [1]
- a) K kg mol⁻¹ or K (molality)⁻¹ b) kg mol⁻¹ K⁻¹ or K⁻¹(molality)⁻¹
c) K mol kg⁻¹ or K (molality) d) mol kg K⁻¹ or K⁻¹(molality)
75. Solution of hydrogen in palladium is an example of [1]
- a) Gas in gas b) Solid in solid
c) Liquid in gas d) Gas in solid