PRAADIS EDUCATION

CHEMISTRY XII

2- SOLUTIONS

WORKSHEET 2

OBJECTIVE QUESTIONS

1.	**LESSON 2: SOLUTIONS(1)** **CASE-STUDY PASSAGE BASED MULTIPLE CHOICE.** 1.Scuba divers must cope with high concentrations of dissolved gases while breathing air at high pressure underwater. Increased pressure increases the solubility of atmospheric gases in blood. When the divers come towards surface, the pressure gradually decreases. This releases the dissolved gases and leads to the formation of bubbles of nitrogen in the blood. This blocks capillaries and creates a medical condition known as bends, which are painful and dangerous to life. To avoid bends, as well as the toxic effects of high concentrations of nitrogen in the blood, the tanks used by scuba divers are filled with air diluted with helium, nitrogen, and oxygen. 1.Scuba divers carry the cylinder consisting the mixture of gases diluted in air A) O_2, He, CO_2 B) O_2, He, N_2 C) O_2, He, Ne D) O_2, Ar, N_2	B)
2.	2.The people living longer at high altitudes suitably suffer from the disease known as A) High blood pressure B) Breathlessness c) suffocation D) Anoxia	D)
3.	3.Soft drinks are prepared by dissolution of CO_2, by applying more pressure, this can be understood by A) Daltons law B) Charles law C) Henrys law D) Avogadro law	C)
4.	4.What is the effect of temperature on solubility of gases in liquids. A) No effect B) Increase in temperature decreases solubility C)Increase in temperature increases solubility D) It cannot be correlated.	B)
5.	5)If scuba divers do not carry the proper diving device along with appropriate cylinder containing suitable mixture of required gases, meant for breathing support, when they come to surface they experience A) Blood clots B) Scratches on the skin C) Burst capillaries	D)

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	D) causes bends	
6.	2. Our Human body has portions of organs at different osmotic pressure and an active pumping mechanism is required to offset osmosis. The cells of the transparent tissues of exterior eye, the cornea, have a more concentrated optical fluid than does the aqueous humor, a solution just behind the cornea. To prevent the cornea from taking up additional water from the aqueous humor, cells that pump water are located in the corneal tissues adjacent to aqueous humour. Answer the following questions, in few words? 6)What is the direction of osmosis between corneal tissues and aqueous humor? Ans : Osmosis takes place from hypotonic to hypertonic solution .Thus ,in our eyes, osmosis takes place from aqueous humor to cornea	Ans : Osmosis takes place from hypotonic to hypertonic solution .Thus ,in our eyes, osmosis takes place from aqueous humor to cornea
7.	7) Corneas that are used for transplants must be removed from the globe of eye, soon after donor's death. Explain Why? Ans: Corneas that are to be stored and used for transplants must be removed from the globe of eye soon after the donor's death. This prevents the clouding that occurs when pumping mechanism fails after death.	Ans: Corneas that are to be stored and used for transplants must be removed from the globe of eye soon after the donor's death. This prevents the clouding that occurs when pumping mechanism fails after death.
8.	3.PASSAGE: In winter season, aqueous solution of NaCl is sprinkled along road side of hill stations, to clear the roads after heavy snow fall. On the other hand, freezing mixture of salt and ice is used in the manufacture of ice cream. Answer following questions with few words. 8)What is the principle behind the clearance of road after snow fall? Ans: When solution of NaCl is sprinkled over snow, the freezing point	Ans: When solution of NaCl is sprinkled over snow, the freezing point is lowered and

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	is lowered and snow melts. Thus, roads are cleared for traffic.	snow melts. Thus, roads are cleared for traffic.
9.	9). Why the liquid material of ice cream freezes soon when the cane containing material is dipped in freezing mixture. Ans: In the freezing mixture (combination of salt and ice) the freezing point is lowered to -200 C hence the liquid material of ice cream freezes.	Ans: In the freezing mixture (combination of salt and ice) the freezing point is lowered to -200 C hence the liquid material of ice cream freezes.
10.	10) What is the value behind this kind of Act? Ans: One should keep the surrounding clean.	Ans: One should keep the surrounding clean
11.	4.Passage: one day a dental check-up was conducted for particular class in a school .it was found that some students had cavities in their teeth. The teacher asked them how many chocolates or sweets do they eat? Which tooth paste do they use for brushing their teeth, does it contain fluoride or not. Answer the following with few words 11). What values are expressed by teacher? Ans: one should not eat too many chocolates or sweets as they damage our teeth.	Ans: one should not eat too many chocolates or sweets as they damage our teeth.
12.	12)What is the limiting value of fluoride that should be present in the tooth paste? What happens if this limit is exceeded? Ans: The fluoride present in the paste would be up to 1ppm. If it exceeds up to 1.5 ppm, the teeth become mottled. If it exceeds above 1.5 ppm it becomes a poison. Mainly rats poison is NaF, that contains more amount of fluoride.	Ans: The fluoride present in the paste would be up to 1ppm. If it exceeds up to 1.5 ppm,

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		the teeth become mottled. If it exceeds above 1.5 ppm it becomes a poison. Mainly rats poison is NaF, that contains more amount of fluoride.
13.	**MULTIPLE CHOICE QUESTIONS** 13.What is the normality of 1M H3PO4 solution? A) 0.5 N B)1.0 N C)2.0 N D)3.0 N	D)
14.	14). An azeotropic mixture of two liquids boils at a temperature lower than either of them when A) it is saturated B) it does not deviate from Raoults law C) it shows positive deviation from Raoults law D) it D)shows negative deviation from Raoults law.	C)
15	15.The hard cell of an egg was dissolved in HCl. The egg was then placed in a concentrated solution of Nacl. What will happen? A) The egg will shrink B) The egg will swell C)The egg will become harder D) There will be hardly any change	A)
16.	16. A substance will be deliquescent, if its vapour pressure is A) equal to the atmospheric pressure B) equal to that of water vapour in air C)lesser than that of water vapour in air D)greater than that of water vapour in air.	C)
17.	17.solutions A, B, C, D are 0.1M glucose,0.05M NaCl,0.05M BaCl2 and 0.1M AlCl3 respectively. Which of the following pairs is isotonic? A) B and C B) A and B C) A and D D) A and C	B)

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18.	18.Camphor is often used in molecular mass determination because A) it is readily available B) it has very high cryoscopic constant C)It is volatile D) It is solvent for organic substances	B)
19.	19.If an Aqueous solution of glucose is allowed to freeze, then crystals of which will be separated out first? A) Glucose B) Water C) both of these D) None of these	B)
20.	20.The depression in freezing point for 1M urea, IM glucose, and 1M NaCl are in the ratio A) 1:2:3 B) 3:2:2 C) 1:1:2 D) None of these	C)

21.	21.. A substance will be deliquescent ,if its vapour pressure is A)equal to the atmospheric pressure B)equal to that of water vapour in air C)lesser than that of water vapour in air D)greater than that of water vapour in air.	C)

22.	**REASONING-ASSERTION TYPE QUESTIONS.** A) Assertion and reason both are correct statements and reason is correct explanation for assertion. B) Assertion and reason both are correct statements but reason is not correct explanation for assertion. C)Assertion is correct statement but reason is wrong statement. D)Assertion is wrong statement but reason is correct statement. 22.Assertion: Molarity of a solution in liquid state changes with temperature. Reason: The volume of a solution changes with change in temperature	A)
23.	23. Assertion: 0.1 M HCl solution has higher osmotic pressure than 0.1 M NaCl solution. Reason: Cl- ions being common, the small size H+ ions have greater ionic mobility than large size Na+ ions.	D)

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24.	24.Assertion: If on mixing the two liquids, the solution becomes hot, it implies that it shows negative deviation from Raoults law. Reason: Solution which show negative deviation are accompanied by decrease in volume.	B)
25.	25.Assertion: Vapor pressure of water is less than 1.013 bar at 373 K Reason: Water boils at 373 K as the vapour pressure at this temperature becomes equal to atmospheric pressure.	D)
26.	26.Assertion: Any concentration of NaCl solution can be injected intravenously as NaCl being a common table salt, is a harmless chemical. Reason: 0.9% (mass/volume) NaCl solution is isotonic with the fluid inside the body cells.	D)
27.	27.Assertion: Vant Hoff factor for benzoic acid in benzene is less than one. Reason: Benzoic acid behaves as a weak electrolyte in benzene.	C)
28.	28.Assertion: One molar aqueous solution has always a higher concentration than one molal solution. Reason: The molality of a solution depends on the density of solution whereas molarity does not.	C)
29.	29. Assertion: Out of various colligative properties, osmotic pressure is used for determination of molecular masses of polymers. Reason: Polymer solutions do not possess a constant boiling point or freezing point.	A)
30.	30.Assertion: The Vapour pressure of 0.1M sugar solution is less than that of 0.1 M KCl solution. Reason: Lowering of vapour pressure is directly proportional to the number of solute particles present in the solution.	A)
31.	31.Assertion: Ethylene glycol is used as antifreeze in the radiator of a car. Reason: Ethylene glycol is insoluble in water due to lack of its ability to form hydrogen bond with water molecules.	C)

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1.	**CLASS XII** **TOPIC: SOLUTIONS(2)** **Read the assertion and reason carefully to mark the correct option out of the options given below:** (a)If both assertion and reason are true and the reason is the correct explanation of the assertion. (b)If both assertion and reason are true but reason is not the correct explanation of the assertion. (c)If assertion is true but reason is false. (d)If assertion is false but reason is true. 1.Assertion : One molal aqueous solution of urea contains of urea in water. Reason:Solution containing one mole of solute in solvent is called as one molal solution.	A)
2.	2.Assertion: Azeotropic mixtures are formed only by non-ideal solutions and they may have boiling points either greater than both the components or less than both the components. Reason : The composition of the vapour phase is same as that of the liquid phase of an azeotropic mixutre.	B)
3.	3.Assertion: Molecular mass of polymers cannot be calculated using boiling point or freezing point method. Reason : Amorphous polymers solutions do not possess a constant boiling point or freezing point.	B)
4.	4.Assertion: Reverse osmosis is used in the desalination of sea water. Reason : When pressure more than osmotic pressure is applied; pure water is squeezed out of the sea water through the membrane.	A)
5.	5.Assertion: Elevation in boiling point and depression in freezing point are colligative properties. Reason : All colligative properties are used for the calculation of molecular masses.	B)
6.	6.Assertion: Use of pressure cooker reduces cooking time. Reason: At higher pressure cooking occurs faster.	A)

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7.	7.Assertion: Isotonic solution do not show the phenomenon of osmosis. Reason: Isotonic solutions have equal osmotic pressure.	A)
8.	8.Assertion: Henry's law and Roult's law are not independent, i.e., one can be derived from the other. Reason : The partial pressure is directly proportional to the mole fraction of the concerned species for ideal solutions.	B)
9.	9.Assertion: An ideal solution obeys Raoult's law Reason : In an ideal solution, solute-solute as well as solvent-solvent interactions are similar to solute-solvent interactions	A)
10.	10.Assertion: One molar solution is always more concentrated than one molal solution (assume density of solution is 1 gm/mL) Reason : The amount of solvent in 1 M solution is always less than 1 m aqueous solution	A)
1.	**Passage I** The osmotic pressure ( ) depends on the molar concentration of the solution (=CRT). If two solutions are of equal solute concentration and, hence, have the same osmotic pressure, they are said to be isotonic. If two solutions are of unequal osmotic pressure, the more concentrated solution is said to be hypertonic and the more diluted solution is described as hypotonic. Osmosis is the major mechanism for transporting water upward in the plants. Answer the following questions. 1. A plant cell shrinks when it is kept in: a) Hypotonic solution b) Hypertonic solution c) Isotonic solution d) pure water.	B)
2.	2. What would be the percent strength of solution of urea that would be isotonic with 4.5% solution of glucose? a) 4.5% b) 13.5% C) 1.5 % d) 9 %	C)
3.	3. The glucose solution to be injected into the bloodstream and the blood itself should have the same; a) Molarity b) Molality c) Osmotic pressure	C)

	d) Viscocity	
4.	4. Isotonic solution have same a) Density b) Molefraction c) Molality d) Osmotic pressure	D)
5.	5. Osmotic pressure is based on the which of the following concentration terms a) Molarity b) Molality c) Molefraction d) Normality	A)
6.	**Passage II** The solution which boil at constant temperature like a pure liquid and possess same composition in liquid as well as vapor state are called azeotropes. The components of azeotropes cannot be separated by fractional distillation. Only non-ideal solutions form azeotropes. Solutions with negative deviation form maximum boiling azeotrope and solutions with positive deviation forms minimum boiling azeotrope. The boiling point of an azeotrope is never equal to the boiling points of any of the components of the azeotrope. **Answer the following questions** 6. The azeotropic solutions of the two miscible liquids A) Can be separated by simple distillation B) May show positive or negative deviation from Raoult's law C) Are supersaturated D)Behave like single pure component and does not boil at a fixed temperature	B)
7.	7. Solutions which distill without any change in composition or temperature are called a) Saturated b) Supersaturated c) Ideal d) Azeotrope	D)
8.	8. The azeotropic mixture of water and HCl boils at 108.5oC. The solution is a) Ideal b) Non ideal with positive deviation c)Non ideal with negative deviation d) None of these	C)
9.	9. 100 mL of liquid A and 50 mL of liquid B are mixed to form 138 mL of solution, it is a) Ideal solution	B)

	b) High boiling azeotrope c)Low boiling azeotrope d) None of these	
10.	10. Which among the following combinations is a maximum boiling azeotrope. a) $H_2O + CH_3OH$ b) CCl_4+CHCl_3 c) $(CH_3)_2CO + C_2H_5OH$ d) H_2O+HNO_3	D)

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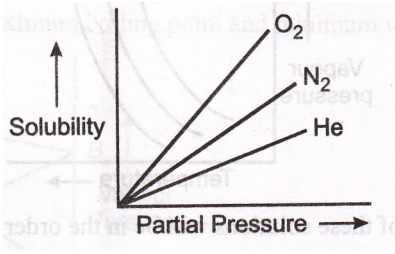
1.	**TOPIC : SOLUTIONS(3)** **Multiple choice questions:** 1.The vapour pressure of a solution of 5 g of non-electrolyte in 100 g of water at a particular temperature is 2985 N/m^2 . The vapour pressure of water is 3000 N/m^2 . The molecular mass of the solute is: 1) 60 2) 12 3) 180 4) 380	3)
2.	2.The Henry's law constant for the solubility of N_2 gas in water at 298 K is 1×10^5 atm. The mole fraction of N_2 in air is 0.8. The number of mole of N_2 from air dissolved in 10 moles of water at 298 K at 5 atm pressure is: 1) $4x10^{-4}$ 2) $4x10^{-5}$ 3) $5x10^{-5}$ 4) $4x10^{-5}$	1)
3.	3. Mixture of volatile components A and B has total vapour pressure (in torr): $P = 254 - 119X_A$ where, X_A is mole fraction of A in mixture. Hence P_A^0 , and P_B^0 are (in torr) : 1) 254,119 2) 119,254 3) 135,254 4) 154,119	3)
4.	4.Molar solubility of helium, nitrogen and oxygen are plotted against partial pressure of the gas at constant temperature. 	2)

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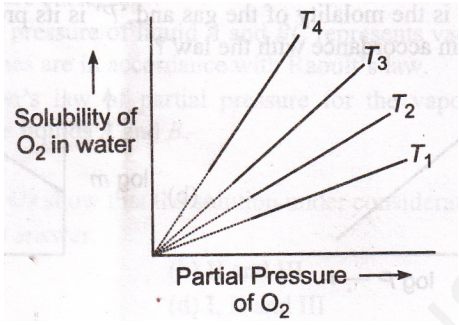
	Henry's law constant for these gases will lie in following sequence ? 1) $O_2 > N_2 > He$ $O_2 < N_2 < He$ $O_2 = N_2 = He$ $O_2 > N_2 < He$	
5.	5.Solubility of oxygen gas in water follows Henry's law. When the solubility is plotted against partial pressure at a definite temperature, we get following plots.  Which of the following sequence of temperature is correct ? 1) $T_1 = T_2 = T_3 = T_4$ $T_1 > T_2 > T_3 > T_4$ $T_1 < T_2 < T_3 < T_4$ $T_1 > T_2 < T_3 > T_4$	2)
6.	6. 620 g glycol is added to 4 kg water in the radiator of a car. What amount of ice will separate out at -6°C? $K_f = 1.86 K\ kg\ mol^{-1}$ 1) 800 g 2) 900g 3) 600g 4) 1000g	2)
7.	7.Two liquids A and B form ideal solutions. At 300 K, the vapour pressure of solution containing 1 mole of A and 3 mole of B is 550mm Hg. At the same temperature, if one more mole of B is added to this solution, the vapour pressure of the solution increases by 10 mm Hg. Determine the vapour pressure of A and B in their pure states (in mm Hg.) 1) 400, 600 2) 500, 500 3) 600, 400 4) 300,500	1)

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8.	8. Two liquids A and B have vapour pressure in the ratio $P_A^0 : P_B^0 = 1:3$ at a certain temperature Assume A and B form an ideal solution and the ratio of mole fractions of A to B in the vapour phase is 4:3. Then the mole fraction of B in the solution at the same temperature is : 1) $\frac{1}{5}$ 2) $\frac{2}{3}$ 3) $\frac{4}{5}$ 4) $\frac{1}{4}$	1)
9.	9.When 36.0 g of a solute having the empirical formula CH_2O is dissolved in 1.20 kg of water, which freezes at -. $0.93^0 C$ What is the molecular formula of the solute ? ($K_f = 1.86^0 C\ kg\ mol^{-1}$) 1) C_2H_4O 2) $C_2H_2O_2$ 3) $C_2H_4O_3$ 4) $C_2H_4O_2$	4)
10.	10.At 300 K, 40 mL of O3 (g) dissolves in 100g of water at 1.0 atm. What mass of ozone dissolves in 400 g of water at a pressure of 4.0 atm at 300 K ? 1) 0.1 g 2) 1.2 g 3) 0.48 g 4) 4.8 g	2)

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11.	$\frac{\Delta T_b}{K_b}$ 11.Ratio of of 10 g AB2 and 14 g A2B per 100 g of solvent in their respective, solution (AB2 and A2B both are non-electrolytes) is 1 mol/kg in both cases. Hence, atomic wt.of A and B are respectively: 1) 100,40 2) 60,20 3) 20,60 4) 40,60	2)
12.	12.Which of the following is correct for an ideal solution 1) $\Delta H_{mix} = 0, \Delta V_{mix} = 0$ 2) $\Delta V_{mix} = 0, \Delta S_{mix} = 0$ 3) $\Delta H_{mix} < 0, \Delta V_{mix} > 0$ 4) $\Delta H_{mix} > 0, \Delta V_{mix} < 0$	1)
13.	13.The properties of solutions which depend only on the number of particles of solute but independent of the nature of solute are called 1) extensive property 2) intensive property 3) colloidal property 4) Colligative property	4)
14.	14. At $10^0 C$ the osmotic pressure of urea solution is 500mm. The solution is diluted and temperature is raised to $25^0 C$ the osmatic pressure of dilute solution is 105.3mm at $25^0 C$. If V_i and V_f are initial and final volumes of solution, the extent of dilution can be shown as 1) $V_f = 5V_i$ 2) $V_i > V_f$ 3) $V_f = 4V_i$ 4) $V_f = 6V_i$	1)
15.	15.Solution distilled without change in composition at a temperature is called 1) amorphous 2) Azeotropic mixture 3) Ideal solution 4) Super staturated solution	2)

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16.	16.On mixing o $10ml$ f acetone with o $40ml$ f chloroform the total volume of solution is 1) $< 50ml$ 2) $> 50ml$ 3) equal to 50ml 4) cannot be predicted	3)
17.	17. A mixture of Bezene and Toluene forms 1) An ideal solution 2) Non Ideal solution 3) Suspension 4) Emulsion	1)
18.	18.The relationship between osmotic pressure at 273 K when 10 g glucose (P1), 10 g urea(P2) and 10 g sucrose(P3) are dissolved in 250 ml of water is 1) P1>P2>P3 2) P3>P1>P2 3) P2>P1>P3 4) P2>P3>P1	3)
19.	19.an aqueous solution of ethanol in water has vapour pressure 1) equal to the water 2) equal to that of ethanol 3) more than that of water 4) less than that of water	3)
20.	20.The relative lowering of Vapour Pressure dissolving $71.3\,gm$ of a substance in $1000\,gm$ of water is 7.13×10^{-3} the molecular mass of the substance is 1) 180 2) 218 3) 134 4) 80	1)

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21. Match the following:	
Coloumn I	**nColoumn II**
a. Hypertonic	p. solutions having same osmotic pressure
b. Isotonic	q. One solution has higher osmatic pressure than the second solution
c. Hypotonic	r. solutions which obeys Roults law
d. Ideal solutions	s. One solution has lower osmatic pressure than the second solution
1)A-q, B-p, C- s, D- r 2)A-p, B-q, C- s, D- r 3)A-q, B-p, C- r, D- s 4)None of these	Ans: 1)

22. Match the following: **Column I**	**Coloumn II**
a. Molality	p. Number of gram moles of solute per Kg of solvent
b. Molarity	q. Number of moles of solute per lit of solution
c. Molefraction of solute	r. Number of moles of solute/ number of moles of solute+ number of moles of solvent
d. Ppm	s. parts per million
1. A-p, B-q, C- s, D- r 2. A-p, B-q, C- r, D- s 3. A-q, B-p, C- r, D- s 4. None of these	Ans: 2)

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23. Match the following: **Column I**	**Column II**
a). Chloroform + Nitric acid	p. effect of pressure on solubility of a gas in liquid
b). Henry's law	q. Ideal solution
c). Alcohol+water	r. non ideal with positive deviation
d). Benzene + Tolune	s. non ideal with negative deviation
1)A-p, B-q, C- s, D- r 2)A-p, B-q, C- r, D- s 3)A-s, B-p, C- r, D- q 4)None of these	Ans: 3)

21.	**Match the following:** **COLUMN 1** **COLUMN 2**	**Answers**
	1.Soda water a) A solution of gas in liquid. 2.Sugar solution b) A solution of gas in gas 3.German silver c) A solution of solid in solid 4.Air d) A solution of solid in solid 5.Hydrogen gas in palladium e) A solution of gas in liquid f) A solution of liquid in solid	1-e 2-c 3-d 4-b 5-a

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