Chemistry unit 10 solutions test review answers

Combine each description in column B with the correct term in column A. Write the correct description letter in the vacuum provided. The column A is made up of a solution dissolved in 1 kg of solvent. Choose the best answer and write your letter in white. ______ 11. Increase the temperature of a solid-liquid solution will increase the rate in which a crystalline solute dissolves. b. Increase the quantity of crystalline solute that dissolves. c. Both A and B d. Neither in nor © © b____ 12. Which of the following operations usually melts faster a substance in a solvent? to. Agitation b. Raise the temperature c. Crush in a dust d. All these _ 13. To increase the solubility of a gas at a constant temperature and 202 kPa pressure from 0.85 g / l to 5.1 g / l, the pressure should increase. b remains the same. c Decrease. D No Answer. _ 14. If the pressure of a gas over a liquid has decreased (at a constant temperature, the gas solubility in the liquid a. remains unchanged b. Increase c. Decrease d. It would change but in an unpredictable direction _ 15. An ion compound has a 30 g solubility for 100 ml of water at room temperature. A solution containing 70 g of the compound in 250 ml of water at the same temperature is one. saturtated c. insaturated b. Supersaturated d. A suspension _ 16. How many ml of alcohol are in 240 ml of alcohol solution 95.0% (% = vof solute / vof solution * 100?) a. 12 ml b. 228 ml c. 145 ml d. 142 ml _ 17. If more solvent is added to a solution a. The molarity decreases b. The solution becomes less diluted c. percent increases d. All these _ 18. What is the molarity of a solution of 200 ml in which 0.2 mole of sodium bromide is dissolved? to. 00:20 M b. 1.0 M c. 00:40 M d. ______ 19. Which of the following is not a properly creating a solution? to. Boiling point Elevation c. Lowering steam pressure b. Solubility d. Freezing Depression Point ____ 20. If a mole of each of these solutes is added to the same amount of water, which solution has the highest boiling point? to. Copper chloride (II), cucl2 b. glucose, $C_6H_{12}O_6$ c. Magnesium acetate, MG (C2H3O2) 2 d. Aluminum sulfate, AL2 (SO4) 3 C. True-false rank each of these statements as always true, at, sometimes true, st, or never true, nt. The solubility of a solution can be increased by cooling the solvent. # 22. The rectification of a solute increases the rate to which it would dissolve. 23. As an open bottle of a carbonated drink heats up, the concentration of dissolved carbon dioxide decreases. # 24. One hundred ml of a 5.0 m sodium chloride solution is more concentrated than 1.0 l of a 1.0 M sodium chloride solution. _____ 25. The quantity of sodium chloride in 100 ml of A 5.0 m Nacl solution is greater than that in 1.0 l of a NACL 1.0 m solution. _____ 26. How the solvent temperature increases, the solubility of a gaseous solute increases. _____ 27. 50 ml of a 16% solution of ethyl alcohol in water contains 16 ml of water. _____ 28. An unsaturated solution has a great quantity of solute than the solvent. # 29. A saturated solution has a great quantity of solute than the solvent. # 30. If a crystal of a substance added to an aqueous solution dissolves, then the original solution containing that substance has been supersaturated. D. Problems resolve the following problems in the space provided. Show your work. 31. How to prepare 250 ml of 0.60 m al2 (SO4) 3 solution from a solution of 2.0 m al2 (SO4) 3 stocks? 32. Calculate the molarity of a prepared solution dissolving 95.5 g of KNO_3 in sufficient water to make a solution of 750 ml. 33. Calculate the boiling point of a solution that contains 0.900 mol of K_3PO_4 dissolved in 2750 g of water. (KB for water = 0.512 OC / m.) 34. Calculate the molosity of a prepared solution dissolving 175 g of KNO_3 in 1250 g of water. 35. A 10.6 g solution of a non-volatile compound in 55.0 g of water freezes at -3.26 OC. What is the molecular mass of the solute? Assume the solution exists as molecules in the solution. (KF for water = 1.86 oc / m.) (Hint: You need to use more than one formula to solve this problem. The formula for molarity is one of them.) By the end of this form, you will be able to : Describe the effects of temperature and pressure on the Law of Henry of solubilità and use it in calculations involving the solubility of a gas in a liquid explaining the degrees of possible solubility for liquid solutions imagine to add a small amount of salt to a glass D 'Water, stirring until all salt melted, and then adding a little more. This process can be repeated until the concentration of salt of the solution reaches its natural limit, a limit determined mainly by the relevant solute-soluto-soluto-soluto points, solvent and solvent-solvent attractive forces discussed in the previous two modules of this chapter. You can be sure that you have reached this limit because it doesn't matter how long the solution is mixed, the salted salt remains. The concentration of salt in the solution at this point is known as its solubility. The solution of a solute in a particular solvent is the maximum concentration that can be achieved under certain conditions when the dissolution process is in balance. Refer to the Example of Salt in Water: When the concentration of a solute is equal to its solubility, it is said that the solution is saturated with that solute. If the solutile concentration is lower than its solubility, the solution is said unsaturated. A solution that contains a relatively low concentration of solute is called diluted, and one with relatively high concentration is called concentrated. If we add more salt to a saturated salt solution, we see it fall to the bottom and no longer seems to dissolve. In fact, the added salt dissolves, as represented by the direction ahead of the dissolution equation. Accompanying this process, the loose salt precipitates, as depicted by the reverse direction of the equation. It is said that the system is balanced when these two reciprocal processes occur at parity of speed, and therefore the quantity of undesisserted and dissolved salt remains constant. Support for simultaneous occurrence of dissolution and precipitation processes is supplied by noticing that the number and size of unresolved salt crystals will change over time, even if their combined mass will remain the same. Use this interactive simulation to prepare various saturated solutions. The solutions can be prepared where a solutical concentration exceeds its solubility. It is said that these solutions are supersaturated, and are interesting examples of non-equilibrium states. For example, the carbonated drink in an open container that has not yet â € â € flatâ € is supersaturized with carbon dioxide gas; Time, CO_2 concentration will decrease until it reaches its balance value. Watch this impressive video that shows sodium acetate precipitation from a supersaturated solution. In a previous form of this chapter, the effect of intermolecular attractive forces on solution formation was discussed. The chemical structures of the solute and solvent dictates the types of possible forces and, consequently, are important factors in determining the solubility. For example, in similar conditions, oxygen water solubility is about three times greater than that of helium, but 100 times lower than chloromethane solubility, $CHCl_3$. Considering the role of the solvent chemical structure, note that the oxygen solubility in the hexane of liquid hydrocarbons, C_6H_{14}, is about 20 times greater than it is in water. Other factors also affect the solubility of a certain substance in a given solvent. The temperature is such a factor, with gas solubility generally decreasing how the temperature increases (figure 1). This is one of the main impacts deriving from thermal pollution of natural water bodies. Figure 1. The solubilities of these gases in water diminish while temperature increases. All solubilities have been measured with a constant pressure of 101.3 kPa (1 atm) of gas over the solutions. When the temperature of a river, a lake or a stream is raised anorormally high, usually due to the discharge of hot water from a certain industrial process, the oxygen solubility in the water has decreased. The reduced levels of dissolved oxygen can have serious consequences for the health of ecosystems of water and, in serious cases, can cause serious large-scale fish kills (Figure 2). Figure 2. (a) The small air bubbles in this glass of refrigerated water formed when the water heats up at room temperature and the solubility of its dissolved air decreased. (b) the decrease in oxygen solubility in natural waters subject to thermal pollution can cause serious fish leaks. (believed to: Modification of the work of Liz West; Credit B: Modification of the work of U.S. Fish and Wildlife Service) The solubility of a gaseous solute is also influenced by the partial pressure of solour in the gas to which the solution is exposed. SOLUBILITY gas increases as gas pressure increases. The carbonated drinks provide a nice illustration of this report. carbonation process involves beverage exposure to relatively high carbon pressuregas and poi sigillare il contenitore della bevanda, saturando così la bevanda con co2 a questa press. when il contenitore della bevanda è tightening, un suo familiare viene sentito come lapress del gas di anidride carbonica viene rilasciato, e alcuni del biosido di carbonio disciolto è in genere vista lasciare la soluzione sotto forma di piccole bolle (Figure 3.) a questo punto, la bevanda èzione superstructure figure 3. l'apertura della bottiglia di bevanda carbonata riduce lapress dell'anidride carbonica gassosa sopra la bevanda. la solubilità di co2 è quindi abbassata, e alcuni diossido di carbonio disciolto può essere vista lasciando la soluzione come piccole bolle di gas. (I believe: modifies del lavoro di derrick coetzee) per molti soluti gassosi, il rapporto tra solubilità, cg and press parziale, pg, è prozionale: [latex]C_{\text{g}} = kP_{\text{g}}[/latex] dove k è una costante diprozionalità questa è una dichiarazione matematica della legge di enrico: la quantità di un gas ideale che si dissolve in un determinato volume di liquido è directlyprozionale alla press del gas. applicazione della legge di henry a 20 °C, la concentrazione di ossigeno disciolto in acqua esposta a ossigeno gassoso ad una press parziale di 101.3 kpa (760 torr) è 1.38 × 10−3 mol L−1. uszare la legge di henry per determine la solubilità dell'ossigeno when la suapress parziale è 20.7 kpa (155 torrr,) la press approssimata di ossigeno nell'atmosfera terrestrial. \\ [responsabile] [responsabile] [/letterally]}[/letterx] [latex]1.36\;\times\;10^{-5}\;\text{mol\; L}^{-1}\;\text{kPa}^{-1}\\time\\\\}; si noti che varie unità podeno essere us quantolite qualsiasi combinazione di unità che si cede ai vincoli di analisi dimensionale è accettabile. controllare il vostro apprendimento esponendo un campione di acqua di 100.0 ml a 0 °C ad un'atmosfera che contiene un soluto gassoso a 20.26 kpa (152 torrr) ha portato alla dissoluzione di 1.45 × 10−3 g del soluto. uszare la legge di henry per determine la solubilità di questo soluto gassoso when la suapress è 101.3 kpa (760 torr.) 7.25 × 10−3 in 100.0 ml the 0.0725 g/L malattia di decompressione (dcs,) the "le curve," è un effetto dellapresstada increases dell' oltre alla press esercitata dall'atmosfera, i subacquei sono sottoposti ad una press aggiuntiva dovuta all'acqua sopra di loro, sperimentando un aumento di circa 1 atm per ogni 10 m di profondità. pertanto, l'aria inalata da un subacqueo mentre sommersa contiene gas alla press environmentale superiore corrispondente, and le concentrazioni dei gas disciolti nel sang del subacqueo sono prozionalmente più alte per la legge di enrico. mentre il subacqueo sale sulla superficie dell'acqua, la press ambientee dece e i gas disciolti diventano menoIf the ascent is too fast, the gases coming out of the underwater blood can form bubbles that can cause a variety of symptoms ranging from rashes and joint pains to paralysis and death. To avoid DCS, divers must ascend from depth to relatively slow speed (10 or 20 m/min) or otherwise make several decompression stops, pausing for several minutes to certain depths during the ascent. When these preventive measures are not successful, divers with DCS are often provided with hyperbarian oxygen therapy in pressurized ships called decompression chambers (or recompression) (Figure 4). Figure 4. (a) U.S. Navy divers are trained in a recompression chamber. (b) Subs receive hyperbaric oxygen therapy. The deviations of Henry's law are observed when a chemical reaction occurs between the gaseous solute and the solvent. Thus, for example, the solubility of ammonia in water does not increase so quickly with the increase of pressure as provided by law because ammonia, being a basis, reacts to some extent with water to form ammonium ions and hydroxide ions. Gases can form supersaturated solutions. If a gas solution in a liquid is prepared at low temperature or under pressure (or both), then how the solution warms up or how the gas pressure is reduced, the solution can become supersaturated. In 1986, more than 1700 people in Cameroon were killed when a cloud of gas, almost certainly carbon dioxide, branded by Lake Nyos (Figure 5), a deep lake in a volcanic crater. The water at the bottom of Lake Nyos is saturated with carbon dioxide from volcanic activity under the lake. It is believed that the lake has suffered a turnover due to the gradual heating from below the lake, and the warmer and less dense saturated water with carbon dioxide has reached the surface. As a result, huge amounts of dissolved CO_2 were released, and the colorless gas, which is denser than the air, flows down the valley below the lake and suffocated humans and animals living in the valley. Figure 5. (a) It is believed that the 1986 disaster that killed more than 1700 people near Lake Nyos in Cameroon caused when a large volume of carbon dioxide gas was released from the lake. (b) Since then a CO_2 mouth has been installed to help degaste the lake in a slow and controlled way and prevent such catastrophes from happening in the future. (credited to: change of Jack Lockwood's work; credit b: change of Bill Evans' work) We know that some liquids mix together in all proportions; In other words, they have infinite mutual solubility and are said to be miscible. Ethanol, sulphuric acid and ethylene glycol (popular for use as an antifreeze, depicted in Figure 6) are examples of liquids completely miscible with water. The two-cycle engine oil is miscible with gasoline. Figure 6. Water and antifreeze are miscible; the mixtures of the two are homogeneous in all proportions. (credit: "dno1967"/Wikimedia commons) Liquids that mix with water in all proportions are usually polar substances or substances that form hydrogen bonds. For such liquids, the attractions of the dipolo-dipole (or hydrogen gluing) of molecules solute with solvent molecules are at least as strong as those between molecules in pure solute or pure solvent. So, the two types of molecules mix easily. Similarly, non-polar fluids are mescible with each other because there is no appreciable difference in solute-solvent strengths, solvent-solvent, and solute-solvent intermolecular attractions. The solubility of polar molecules in polar solvents and nonpolar molecules in nonpolar solvents is, once again, an illustration of chemical axiom "as isHow." Two liquids that do not mix in a appreciable way are called immiscible. The layers are formed when we pour immiscible liquids into the same container. Gasoline, oil (Figure 7), benzene, carbon tetrachloride, some paints and many other nonpolar liquids are water-reliable. The attraction between molecules of dieNon-polar liquids and polar water molecules are ineffectively weak. The only strong attractions in this mixture are among the water molecules, then effectively squeeze the molecules of non-pastoral fluid. The distinction between immiscibilità and miscibility is really one of the degrees, so that the miscible liquids are of infinite mutual solubility, while the liquids said to be immiscible are mutual than very low mutual (even if not zero). Figure 7. Water and oil are immiscible. The mixtures of these two substances will form two layers separated with the least dense oil floating on the top of the water. (Credit: Ã ¢ â,¬ Å "ourtwÃ ¢ â,¬ / flickr) Two liquids, such as bromine and water, which are moderate mutual solubility must be partially miscible. Two partially miscible liquids usually form two layers when mixed. In the case of the mixture of bromine and water, the upper layer is water, saturated with bromine, and the lower layer is the saturated bromino of water. Since the bromo is not polar, and therefore not very soluble in the water, the layer of water is only a bit discolored by the bright orange bromino dissolved in it. Because the water solubility in bromine is very low, there is no remarkable effect on the dark color of the shed of the bromino (Figure 8). Figure 8. Bromino (the deep orange liquid on the left) and the water (the transparent liquid in the middle) are partially miscible. The upper layer in the mixture on the right is a saturated solution of bromine in water; The lower layer is a saturated solution of water in the bromine. (Credit: Paul Flowers) The dependence of solubility on temperature for a number of inorganic solids in water is shown by the solubility curves in Figure 9. Revision of such data indicate a general trend to increase solubility with temperature, although there They are exceptions, as illustrated by the sulphate of the ionic compound. Figure 9. This chart shows how the solubility of different solids changes with the temperature. The dependence of the temperature of the solubility can be exploited to prepare solutions out of certain compounds. A solution can be saturated with the mixture at a high temperature (where the solution is more soluble) and then cooled to a lower temperature without precipitating the solute. The resulting solution contains solute to a greater concentration of its balancing solubilità at a lower temperature (ie, is supersatura) and is relatively stable. The precipitation of the excess solute can be started by adding a seed crystal (see the video in the connection to the previous learning in this module) or mechanically figuring the solution. Some warmers, like the one depicted in Figure 10, takes advantage of this behavior. Figure 10. This manual heater produces heat when the sodium acetate in a rushed supersature solution. The precipitation of the solute is started by a mechanical shock wave generated when the flexible metal disc inside the solution is "clicked." (Credit: Modifying the work of Ã ¢ â,¬ Å "VelelaÃ ¢ â,¬ / Wikimedia Commons) This video shows the crystallization process that occurs in a hand heating. The measure in which a substance dissolves in another is determined by several factors, including the relative types and strengths of the intermolecular attractive forces that can exist between the atoms of substances, ions or molecules. This tendency to dissolve is quantified as a solubility of the substance, its maximum concentration in a solution to equilibrium in specified conditions. A saturated solution contains solute to a concentration equal to its solubility. A Supersatura solution is the one in which the concentration of a solute exceeds its solubility "a non-libribrium (unstable) condition that will take to soluble when the solution is properly disturbed. miscible liquids are soluble in all proportions and immiscible liquids exhibit a very low mutual solubility. the solubility for gaseous solids decrease with the increasing temperature, while those for most, but not all, solidsIncrease with temperature. The concentration of a gaseous solute in a solution is proportional to the partial pressure of the gas to which the solution is exposed, a relationship known as the law of Henry. [Latex] c _ {text {g}} = kp _ {text {g}} [/ latex] chemistry end of the chapter exercises suppose that a clear sodium thiosulphate solution is presented, na2s2o3. How can you determine if the solution is unsaturated, saturated or overturned? Most surestry solutions in water are prepared with cooled saturated solutions. Overhabited solutions of most gas gases are prepared with saturated solutions. Explain the reasons for the difference in the two procedures. Suggest an explanation for observations that ethanol, C_2H_5OH, is completely miscible with water and that Ethanethiolo, C_2H_5SH, is soluble only to size 1.5 g per 100 ml of water. Calculate the percentage by mass of KBR in a saturated KBR solution in water at 10 Â ° C. See figure 9 for useful data and reports the percentage calculated to a significant figure. Which of the following gases should be more soluble in water? Explain your reasoning. (a) CH_4 (b) CCL4 (c) CHCL3 at 0 ° C and 1.00 ATM, up to 0.70 g of O_2 can dissolve in 1 l of water. At 0 Â ° C and 4.00 ATM, how many grams of O_2 are dissolved in 1 l of water? Refer to Figure 3. (a) How does CO_2 concentration dissolve in the beverage change when the bottle has been opened? (b) What caused this change? (c) Is the drink unsaturated or overstructed with CO_2? The law on the law of Henry for CO_2 is 3.4 Ãƒ-10 / ATM / ATM at 25 ° C. This is that the pressure of carbon dioxide is necessary to maintain a CO_2 concentration of 0.10 m In a lemon-lime soda can? The law on the law of Henry per O_2 is 1.3 Ã- 10m / atm at 25 Â ° C. As a mass of oxygen it would be dissolved in a Aquarium 40-L at 25 ° C, assuming an atmospheric pressure of 1, 00 atm, and that the partial pressure of O_2 is 0.21 atm? How many liters of HCL gas, measured at 30.0 Â ° C and 745 Torr, are required to prepare 1.25 l of a 3.20 m solution of hydrochloric acid? Henry legal law affirming the proportional relationship between the concentration of gas dissolved in a solution and partial gas pressure in contact with the immizable solution of mutual negligence solubilità; typically refers to mutually soluble mutable liquid substances in all proportions; typically refers to the partially miscible liquid substances of moderate mutual solubility; typically refers to saturated liquids of concentration equal to the solubility; containing the maximum concentration of soluto as possible for a certain measurement of the temperature and the pressure solubility to which a solute can be dissolved in water, or any solvent supersatura of concentration that exceeds the solubility; a state non-unsaturated concentration of the solubility solubility