proprep

Workbook

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Physical Properties of Solutions

Solution Concentration

Questions

1) In order to make juice, 1 part by volume of concentrated juice solution needs to be mixed with 7 parts water. How much (in mL) of concentrated juice solution and water need to be mixed to make 56 mL of juice?

2) A solution contains 2.67 g NaCl and 100 g H_2O.

Calculate the percent by mass of NaCl in the solution.

3) An aqueous glucose solution is 27% glucose by mass.

Calculate the amount of glucose and water in 100 g of solution.

4) You are asked to prepare 270 g of an aqueous solution of glucose with a 16 % glucose by mass concentration.

How much solute and solvent do you need?

5) How many grams of NaCl need to be added to 250 g of H_2O to make a 3.2 % NaCl by mass solution?

6) A solution is prepared by dissolving 9.94 mL ethanol in enough water to produce 80 mL of solution.

$d_{Ethanol} = 0.789 \frac{g}{mL}$, $d_{Solution} = 0.981 \frac{g}{mL}$ at 20 °C

a) Calculate the volume percent of ethanol in the solution.
b) Calculate the mass percent of ethanol in the solution.
c) Calculate the mass/volume percent of ethanol in the solution.

7) Calculate the amount of acetic acid, CH_3COOH, in grams, contained in 520 mL of vinegar.

The mass percent of CH_3COOH in vinegar = 5.01 %

$d_{vinegar} = 1.01 \frac{g}{mL}$

8) 22 g of sugar are dissolved in enough water to produce 250 mL of solution.

Calculate the $\frac{mass}{volume}$ concentration of sugar in the solution in $\frac{g}{L}$.

9) We need to prepare 250 mL of a 20 $\frac{g}{L}$ solution of NaCl.

How much NaCl, in g, do we need?

Answer Key

1) concentrated juice solution – 7 mL

water – 49 mL

2) 2.6 %

3) 27 g glucose

73 g H_2O

4) Solute – 43.2 g

Solvent – 226.8 g

5) 8.26 g

6) a) 12.42%
b) 9.99%
c) 9.8%

7) 26.32 g

8) 88 $\frac{g}{L}$

9) 5 g