**Review Moles and Solutions**

1

In the laboratory Sylvia prepared four solutions which were different in concentration and volume.

The following is the diagram from Sylvia's procedure.



In her report Sylvia listed the solutions in **increasing order** of concentration (**g/L**).

In which order were the solutions listed?

|  |  |
| --- | --- |
| A) | IV, II, III and I |
| B) | II, I, IV and III |
| C) | IV, III, II and I |
| D) | I, III, II and IV |

2

A laboratory technician has to prepare 1.5 L of an aqueous solution of sodium chloride, NaCl, whose concentration is to be 50 g/L.

What procedure should be followed to prepare this solution?

3

You are asked to prepare 200 mL of a salt solution with a concentration of 4 mol/L.

How many grams of salt must be dissolved in 200 mL of solution?

4

A technician has 100 mL of 1.0 mol/L NaOH. A teacher asks for 1 L of 0.1 mol/L NaOH.

Describe how the technician will prepare the second solution from the first.

Labeled sketch--math--steps!

5

What would you do to reduce the concentration of a solution by one half?

|  |  |
| --- | --- |
| A) | Reduce the amount of solute by one half and double the amount of solvent. |
| B) | Add an amount of solvent equal to the volume of the original solution. |
| C) | Evaporate half of the solvent present in the solution. |
| D) | Double the amount of solute. |

6

A 5 litre container of bleach contains an aqueous solution of sodium hypochlorite (NaCIO) whose concentration is 60 g/L. Using this solution, you are to prepare 300 mL of another aqueous solution of NaCIO whose concentration is 20 g/L.

What is your procedure?

Specify all the steps of your procedure and include any calculations.

7

How much chlorine should be added to a 24 000 L pool in order to obtain 1.8 ppm of chlorine?

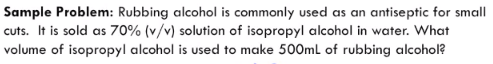
8

Calculate the percent by mass of the solute in an aqueous solution of 2.0 g I2 in 125 g methanol.

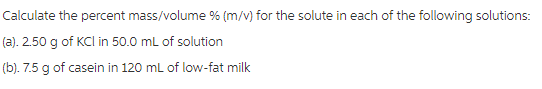
9

How much potassium bromide (KBr), in grams, should be added to water to prepare a 0.50 L of solution with a molarity of 0.125 M?

10



11



12

Which statement correctly describes a **mole**?

|  |  |
| --- | --- |
| A) | The mass of a certain amount of matter |
| B) | A fixed number of particles |
| C) | The amount of matter that occupies a fixed volume |
| D) | A stable density of atoms of the same element |

13

You need 2.0 g of silver (Ag) for an experiment. However, you can only find silver nitrate (AgNO3(aq)) . You decide to extract the silver from the silver nitrate using copper (Cu), according to the following equation:

Cu(s) + 2 AgNO3(aq) → Cu(NO3)2(aq) + 2 Ag(s)

What mass of silver nitrate will you require in order to obtain the 2.0 g of silver that you need?

13

Given 4 samples of different substances and their respective mass :

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |
|  |  |  |  |

Which sample contains the greatest number of moles of matter?

14

You spill some hydrochloric acid (HCl) on the counter.

To neutralize its effect, you use magnesium hydroxide Mg(OH)2. The neutralization

reaction is represented by the following equation:

2 HCl + Mg(OH)2 → MgCl2 + 2 H2O

What mass of Mg(OH)2 is required to neutralize 4 moles of HCl?

15

Use the ions listed below to write formulas for three possible compounds and name them:



16

A student breaks laboratory safety rules when she extinguishes her burner by blowing out the flame. A few moments later, she notices the characteristic smell of methane gas, Ch4. By this time 80 g of methane have escaped. How many moles of this gas escaped into the laboratory air?

17

The problem of the survival of human beings in space has been studied for many years. A human being exhales approximately 924 g of CO2 per day.

In 1938, the British Interplanetary Society suggested the use of NaOH to absorb the gas CO2 generated by humans.

The chemical equation for the absorption of CO2 by NaOH is as follows :

2 NaOH + CO2 → Na2CO3 + H2O

What mass of NaOH must be available aboard a spaceship to absorb the CO2 produced by an astronaut living on board for ten days?

18

Which of the following substances are ionic?

1. H2O

2. NaCl

3. H2O2

4. CaO

5. Br2

6. KI

7. CS2

8. CH4

19

Name the following compounds:

|  |  |
| --- | --- |
| A) | H2SO4 |
| B) | NH4OH |
| C) | NaNO3 |
| D) | CaCO3 |

20

Among the following chemical formulas, which contains a radical (complexion) with a charge of ‑3 ?

|  |  |
| --- | --- |
| A) | (NH4)2SO4 |
| B) | NaNO3 |
| C) | Ca3(PO4)2 |
| D) | MgCO3 |

21

a) Which of the following is the correct formula for the compound of the aluminum cation and the anion, Cr2O72-  ?

|  |  |
| --- | --- |
| A) | AlCr2O7 |
| B) | Al3(Cr2O7)2 |
| C) | Al2Cr2O7 |
| D) | Al2(Cr2O7)3  b)Determine the chemical formula for the compound formed between the anion PO43- and each of the following cations:  a) Sodium  b) Calcium  c) Aluminum  d) Ammonium |
|  |  |