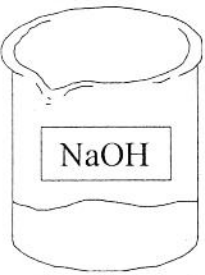

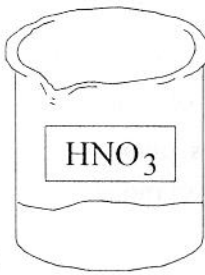
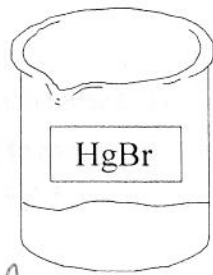


The Mole and the Provincial Exam

Given 4 samples of different substances and their respective mass :

watch your sf!

<p>A 0.3 mol</p>  <p>NaOH</p> <p>$= 10\text{ g} \times \frac{1\text{ mol}}{40\text{ g}}$</p>	<p>B 1.3 mol</p>  <p>NaCl</p> <p>$= 73\text{ g} \times \frac{1\text{ mol}}{58.5\text{ g}}$</p>	<p>C 2.00 mol</p>  <p>HNO₃</p> <p>$= 126\text{ g} \times \frac{1\text{ mol}}{63\text{ g}}$</p>	<p>D 0.50 mol</p>  <p>HgBr</p> <p>$= 140\text{ g} \times \frac{1\text{ mol}}{280.49\text{ g}}$</p>
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Which sample contains the greatest number of moles of matter?

2

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?

- A) 1 280 mol
- B) 16 mol
- C) 5 mol
- D) 1.54 mol
- E) 0.20 mol

↑ CH₄

$$80\text{ g CH}_4 \times \frac{1\text{ mol}}{16\text{ g}} = 5\text{ mol}$$

12, 1 x 4 = 4, 16

3

Your teacher asks you to weigh a sample of 0.15 mole of calcium chloride CaCl₂.

How many grams will you need?

$$0.15\text{ mol CaCl}_2 \times \frac{111\text{ g}}{1\text{ mol}} = 17\text{ g}$$

40, 35.5 x 2 = 71, 111g / 1mol

4

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

1 dog = 12 particles

1 mol = 6.02 × 10²³ particles

Ted Lensen
Video

5 Avogadro formulated an hypothesis to explain the behaviour of gases and to help distinguish between atoms and molecules. Which of the following states his hypothesis?

- A) Different volumes of gases, under different conditions of temperature and pressure, contain the same number of molecules.
- B) Equal volumes of gases, under the same conditions of temperature and pressure, contain the same number of molecules.**
- C) Equal volumes of gases, under the different conditions of temperature and pressure, contain the same number of molecules.
- D) Different volumes of gases, under the same conditions of temperature and pressure, contain the same number of molecules.

6 A mole of a substances corresponds to ...

- A) its mass.
- B) its volume.
- C) a certain number of particles.**
- D) its color.

molar mass = mass of 1 mole
molecular wt = mass of 1 molecule

7 Define the term 'molecular molar mass'.

the mass of 1 mol of a
molecular (covalent) cpd

8 You have 3.1 g of magnesium fluoride (MgF_2).

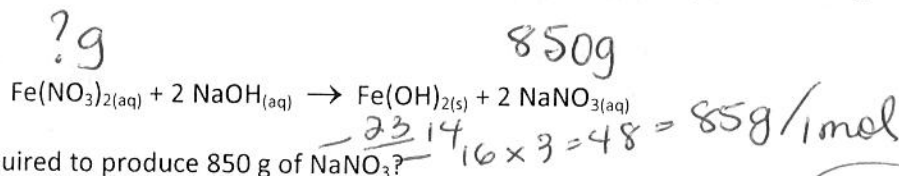
How many moles of MgF_2 are equivalent to this amount?

- A) 0.05 mole
- B) 0.07 mole
- C) 0.36 mole
- D) 2.0 moles

$$\begin{array}{r} - 24.3 \\ - 19 \times 2 = 38 \\ \hline 62.3g \\ 1 \text{ mol} \end{array}$$

$$3.1g \times \frac{1 \text{ mol}}{62.3g} = 0.050 \text{ mol}$$

9 When a solution of iron nitrate, $Fe(NO_3)_{2(aq)}$, reacts with a solution of sodium hydroxide, $NaOH_{(aq)}$, the result is a precipitate, $Fe(OH)_{2(s)}$, and sodium nitrate, $NaNO_{3(aq)}$. This reaction is represented by the following balanced equation:



What mass of $Fe(NO_3)_2$ is required to produce 850 g of $NaNO_3$?

$$850g \text{ NaNO}_3 \times \frac{1 \text{ mol NaNO}_3}{85g} \times \frac{1 \text{ mol Fe(NO}_3)_2}{2 \text{ mol NaNO}_3} \times \frac{179.85g}{1 \text{ mol}} = 900.g \text{ Fe(NO}_3)_2$$

10 Which of the following statements about the mole is true?

- A) The mass of one mole of a substance varies according to the substance. ✓
- B) The volume of one mole is the same for any substance. 1 mol bagel vs 1 mol toothpicks
- C) The number of particles in a mole varies according to the substance. N_A
- D) A mole represents the same mass, regardless of the substance. mm

~~11~~ Which of the following statements about the mole is true?

- ~~A) The mass of one mole of a substance varies according to the substance.~~
- ~~B) The volume of one mole is the same for any substance.~~
- ~~C) The number of particles in a mole varies according to the substance.~~
- ~~D) A mole represents the same mass, regardless of the substance.~~

12 Which of the following statements best defines a mole?

- A) A mole is a quantity of matter. $N_A = 6.02 \times 10^{23}$ anything
- B) A mole is a mass of matter.
- C) A mole is a volume of matter.
- D) A mole is a mass per unit of volume of matter.

13 What is the molar mass of magnesium borate, $Mg_3(BO_3)_2$?

- A) 51.1 g/mol
- B) 179.7 g/mol
- C) 190.5 g/mol
- D) 263.4 g/mol

$24.3 \times 3 = 72.9$
 $10.81 \times 2 = 21.62$
 $16 \times 6 = 96$
} 190.52g

14 You are given 1 mole of $CaCO_3$, $NaOH$ and O_2 .

Which of the following quantities is the SAME for all three chemicals?

- A) Mass
- B) Number of atoms
- C) Number of molecules
- D) Volume

but really should say particles since $CaCO_3$ & $NaOH$ are both ionic \therefore ion aggregates or formula units