الإدارة المركزية للتعليم العام
مكتب تنمية مادة العلـــــوم

CHEMISTRY

2nd secondary
first term

HOME PERFORMANCE



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د. هالة عبدالسلام خفاجي

2026

week

2

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Home performance (Week 2)

Q1/ choose the correct answer:-

1- At STP, calculate the volume of CO_2 gas produced by mixing 20 g of CO gas with an excess amount of oxygen gas according to the following equation:

$$2CO_{(g)} + O_{2(g)} \rightarrow 2CO_{2(g)}$$

[C=12 g/mol , O=16 g/mol]

(a) 45 L
(b)8 L
(C) 23 L
(d) 16 L

2-At 25°C and 1atm, a gas occupies a volume of 4L , How many moles are there?

(a) 0.18 moles of gas molecules
(b) 0.93 moles of gas molecules
(C) 0.17 moles of gas molecules
(d) 8.96 moles of gas molecules

3-How many grams of oxygen gas are necessary to react completely with 2.93×10^{21} atoms of magnesium to yield magnesium oxide?

[O=16g/mol, Mg=24g/mol]

(a) 2.68×10^{-2} g
(b)6.18×10^{-4} g
(C)1.56×10^{-1} g
(d) 7.78×10^{-2} g

4- Propane (C_3H_8) burns completely in excess amount of oxygen (O_2) according to the following equation:

$$C_3H_{8(g)} + 5O_{2(g)} \longrightarrow 3CO_{2(g)} + 4H_2O_{(g)}$$

-If 11.0 grams of C_3H_8 is completely combusted at room temperature , then the volume of CO_2 gas produced is .....

(C=12 g/mol, H=1 g/mol)

(a) 30 cm^3
(b) 30 L
(C) 18 L
(d) 55L



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5- Phosphate radical is detected in its sodium salt by silver nitrate solution According to the following equation:

$$Na_3PO_{4(aq)} + 3AgNO_{3(aq)} \longrightarrow 3NaNO_{3(aq)} + Ag_3PO_{4(s)}$$

-if you start with a pure sample of the sodium Phosphate salt weighs 5 grams, calculate the mass of formed precipitate?

[Na_3PO_4 =164 g/mol, $AgNO_3$ =170g/mol, $NaNO_3$=85g/mol, Ag_3PO_4=419g/mol]

(a) 12.77 g

(b) 12.32 g

(C) 1.95g

(d) 5.00 g

6- Methane gas reacts with oxygen according to the following equation:

$$CH_{4\,(g)} + 2\,O_{2(g)} \rightarrow CO_{2(g)} + 2\,H_2O_{(v)}$$

- If 60 g of oxygen gas is added to 20 gm of methane gas in a closed container , Calculate the total mass of gases and vapors at the end of reaction?

(C=12 g/mol, H=1 g/mol , O =16 g/mol)

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7- Balance the chemical equation for reduction of iron III oxide by carbon monoxide , then calculate the volume of carbon dioxide gas evolved at 273°K and 1 atm from the reaction of 1.6 gm of iron III oxide with 1.68 g of carbon monoxide.

$$Fe_2O_{3(s)} + 3CO_{(g)} \rightarrow \ldots\ldots Fe_{(s)} + \ldots\ldots CO_{2(g)}$$

(Fe = 56 , O=16 , C=12)

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8-In the neutralization reaction between sodium hydroxide and sulphuric acid According to the equation: -

$$2NaOH_{(aq)} + H_2SO_{4(aq)} \rightarrow Na_2SO_{4(aq)} + 2H_2O_{(l)}$$

-If 80 gm of sodium hydroxide is added to 49 gm of sulfuric acid, determine the substances dissolved in water at the end of the reaction.

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9- Ammonia gas (NH_3) is produced by the reaction of nitrogen (N_2) and Hydrogen (H_2):

-How many grams of nitrogen gas are required to prepare 72 liters of ammonia at STP?

(N=14 g/mol, H=1 g/mol)

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10- How many grams of Aluminum metal will be completely oxidized by 44.8L of oxygen at STP according to the following equation?

$$4Al_{(s)} + 3\ O_{2(g)} \rightarrow 2Al_2O_{3(s)}$$

[Al=27, O = 16]

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WEEKLY ASSESSMENTS



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Weekly assessment (Week-2)

Question (1):-

Urea is an important fertilizer, prepared in industry from the reaction of ammonia (NH_3) gas and carbon dioxide gas (CO_2) according to the unbalanced equation below:

$$NH_{3(g)} + CO_{2(g)} \longrightarrow CO(NH_2)_{2(s)} + H_2O_{(l)}$$

- In a large batch reaction, 6.0×10^4 grams of ammonia (NH_3) are mixed with 1.1×10^5 grams of carbon dioxide (CO_2).

1. Balance the chemical equation.

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2. Determine the limiting reactant for this reaction.

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3. Calculate the yield (in kilograms) of urea [$CO(NH_2)_2$] that can be produced.

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4. Calculate the mass (in kilograms) of the excess reactant remaining after the reaction is complete.
(Atomic Masses: N=14.0 g/mol, C=12.0 g/mol, O=16.0 g/mol, H=1.0 g/mol)

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Question (2):-

A student conducts an experiment to synthesize iron (III) oxide (Fe_2O_3) by reacting iron metal (Fe) with oxygen gas (O_2) at high temperature.
According to the balanced equation: $4Fe_{(s)} + 3O_{2(g)} \longrightarrow 2Fe_2O_{3(s)}$

- The student starts with 11.17 grams of solid iron (Fe) and allows it to react with 4.48 liters of oxygen gas (O_2) measured at 25^0C and 1 atm.

[Fe=55.85 g/mol, O=16.00 g/mol]

1-Determine the limiting reactant for this reaction.

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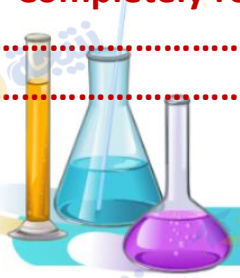
2-Calculate the expected yield (in grams) of Fe_2O_3

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3-Calculate the mass in grams of the limiting reactant that is needed to Completely react with the remaining amount of the other reactant.

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Question (3):-

Given that 7.3 grams of hydrochloric acid is necessary for the complete reaction with a sample of 12.5 gram calcium carbonate, according to the following unbalanced equation:

$$CaCO_{3\,(s)} + HCl_{\,(aq)} \longrightarrow CaCl_{2(aq)} + H_2O_{(l)} + CO_{2(g)}$$

1-Determine whether the sample is pure or impure.

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2-Calculate the volume of evolved carbon dioxide gas at 298° K and 760 mmHg

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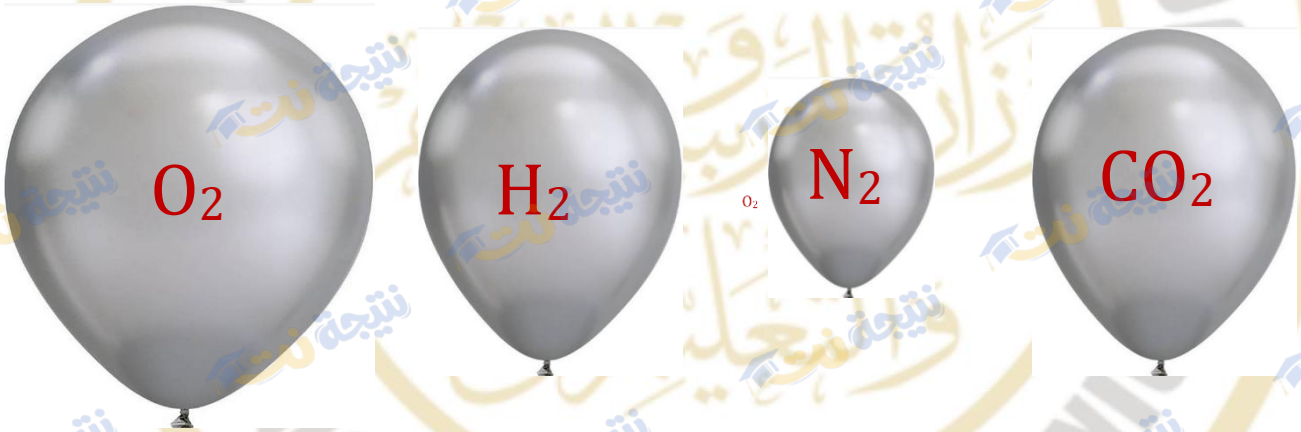
3-Calculate the mass of impurities in the sample if it found.

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Question (4):- Choose the correct answer:-

1-In front of you four balloons contain different gases under the same conditions of temperature and pressure, study the figure well then answer.



(1) (2) (3) (4)

- The balloons that contain the same number of gas molecules are:

(a) Balloons (1) and (4), because they are equal in volume under the same conditions of temperature and pressure

(b) Balloons (2) and (3), because they contain the lightest gases

(c) Balloons (1) and (2), because they are close in volume

(d) All four balloons contain the same number of molecules



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- Given that the volume of balloon (2) is double the volume of balloon (3), the ratio between the number of molecules and the number of atoms in the two balloons, respectively, is:

(a) 2 : 1 for both the number of molecules and the number of atoms
(b) 2 : 1 for the number of molecules, and 4 : 1 for the number of atoms
(c) 1 : 2 for the number of molecules, and 1 : 4 for the number of atoms
(d) 4 : 1 for the number of molecules, and 2 : 1 for the number of atoms

- Given that the volume of balloon (1) equals 4.48 L at 25°C and 760 mmHg, the volume of gas from balloon (2) needed to react completely with the gas in balloon (1), according to the equation:

$$2H_{2(g)} + O_{2(g)} \rightarrow 2H_2O_{(l)}$$ equals (L):

(a) 4.48
(b) 2.24
(c) 8.96
(d) 17.92

2- Ammonia gas (NH3) is prepared from the reaction of nitrogen gas (N2) and hydrogen gas (H2): - How many grams of nitrogen gas are needed to prepare 72 liters of ammonia gas at STP? (N=14 g/mol, H=1 g/mol)

(a) 35.99
(b) 33.60
(c) 42.00
(d) 44.99

3- Aluminum metal (Al) reacts with chlorine gas (Cl_2) to produce aluminum chloride ($AlCl_3$) according to the following equation:

$$2Al_{(s)} + 3Cl_{2(g)} \longrightarrow 2AlCl_{3(s)}$$

- A chemist mixed 20 g of aluminum (Al) with 30 g of chlorine gas (Cl_2) in a reaction vessel.

- Which of the following represents the limiting reagent of the reaction?

(a) Aluminum (Al), because its mass is greater than the mass of chlorine
(b) Chlorine gas (Cl_2), because its number of moles (0.42 mol) is less than the amount needed to react completely with all the aluminum present (0.74 mol)
(c) Both substances are consumed at exactly the same time
(d) The limiting reagent cannot be determined without knowing the temperature and pressure



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- The mass of aluminum chloride ($AlCl_3$) produced by the reaction is approximately (g):

(a) 18.8
(b) 37.6
(c) 49.4
(d) 75.2

-Calculate the mass (in grams) of the excess reactant that remains after the reaction is complete.

(Al = 27 g/mol, Cl = 35.5 g/mol)

(a) 6.2 g
(b) 12.4 g
(c) 24.8 g
(d) 49.6 g



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