

Stoichiometric test

Password

School

Class

Date

Average grade ____, ____.

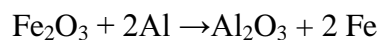
Instructions for students:

Carefully read task requirements and write your response in the space provided following each task. After you complete the task, please rate its difficulty by circling one of the seven offered options (extremely easy, very easy, easy, neither easy nor difficult, difficult, very difficult or extremely difficult).

Throughout the test the following data may be required for solving tasks:

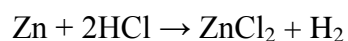
Relative atomic masses: $A_r(\text{H})=1$; $A_r(\text{C})=12$; $A_r(\text{N})=14$; $A_r(\text{O})=16$; $A_r(\text{Na})=23$; $A_r(\text{Al})=27$; $A_r(\text{P})=31$; $A_r(\text{S})=32$; $A_r(\text{Cl})=35.5$; $A_r(\text{K})=39$; $A_r(\text{Ca})=40$; $A_r(\text{Cr})=52$; $A_r(\text{Fe})=55.8$; $A_r(\text{Mn})=55$; $A_r(\text{Cu})=63.5$; $A_r(\text{Zn})=65.4$; $A_r(\text{I})=126.9$; $A_r(\text{Ba})=137.3$; $A_r(\text{Ag})=107.9$; $A_r(\text{Hg})=200,6$; $A_r(\text{Pb})=207.2$

1. Calculate the mass of the aluminum oxide that is produced in reaction of iron(III) oxide and elemental aluminum if 2.7 g of aluminum reacted completely with iron(III) oxide according to the following chemical equation:



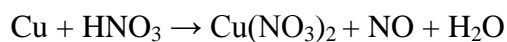
extremely easy	very easy	easy	neither easy nor difficult	difficult	very difficult	extremely difficult
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2. How many moles of hydrogen could be produced in the reaction of 1.31 g of zinc with hydrochloric acid according to the following chemical equation?



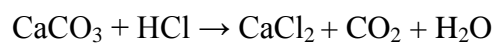
extremely easy	very easy	easy	neither easy nor difficult	difficult	very difficult	extremely difficult
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3. Determine the amount of nitrogen(II) oxide, that is produced in the reaction of 6.35 g of copper with the required amount of dilute nitric acid?



extremely easy	very easy	easy	neither easy nor difficult	difficult	very difficult	extremely difficult
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4. Calculate the amount of gaseous hydrogen chloride that is dissolved in water, if this solution can dissolve 25 g of calcium carbonate.



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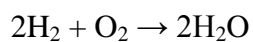
5. How many oxygen molecules are formed in the reaction of potassium permanganate with 11.33 g of 30 % hydrogen peroxide solution in the presence of sulfuric acid?

extremely easy	very easy	easy	neither easy nor difficult	difficult	very difficult	extremely difficult
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6. How many iodine atoms are built in iodine molecules, produced in the reaction of 100 g of 8.3 % potassium iodide solution with the corresponding amount of potassium dichromate in the presence of nitric acid?

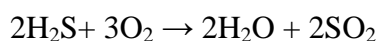
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7. What is the volume of hydrogen required to reacts with 2.8 dm³ of oxygen to produce liquid water (STP)? Density of water is 1g/cm³.



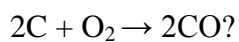
extremely easy	very easy	easy	neither easy nor difficult	difficult	very difficult	extremely difficult
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8. How many molecules of water is produced in the reaction of 3.4 g of hydrogen sulfide with corresponding amount of oxygen according to the following equation:



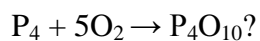
extremely easy	very easy	easy	neither easy nor difficult	difficult	very difficult	extremely difficult
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9. Calculate the volume of carbon monoxide (STP), which is produced from the oxidation of 3.6 g of carbon by the following chemical equation:



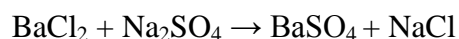
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10. Determine the number of molecules of phosphorus(V) oxide which are produced in the reaction of 16 g of oxygen, according to the following chemical equation.



extremely easy	very easy	easy	neither easy nor difficult	difficult	very difficult	extremely difficult
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11. Calculate the volume of barium chloride solution, concentration of which is 0.1 mol/dm^3 , necessary to yield 2.33 g of barium sulfate in reaction with sodium sulfate.

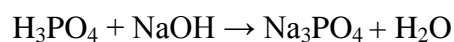


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12. A piece of zinc weighing 4.6792 g was put in dilute sulfuric acid solution. After some time this piece was removed, dried and measured. It has been found that its current mass is twice less than its initial mass. Calculate the volume of gas (STP) produced during this reaction.

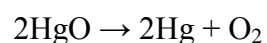
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13. How many cm^3 of 40 % phosphoric acid, density of which is 1.25 g/cm^3 , needs to be added for complete neutralization of 50 cm^3 of sodium hydroxide solution, mass concentration of which is 4 g/dm^3 ?



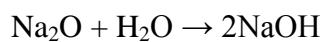
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14. Calculate the number of oxygen molecules that are produced by analysis of $6.023 \cdot 10^{23}$ “molecules” of mercury(II) oxide according to the following equation:



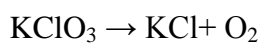
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15. What is the mass of sodium oxide, needed to react with water, to yield 4 moles of sodium hydroxide?



extremely easy	very easy	easy	neither easy nor difficult	difficult	very difficult	extremely difficult
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16. Calculate the mass of potassium chlorate, necessary for obtaining 3.2 g of oxygen by thermal decomposition to potassium chloride.



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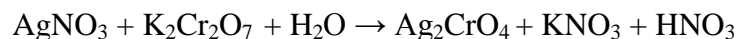
17. At higher temperatures, boron burn to form boron(III) oxide. How many moles of oxygen is necessary for combustion of 0.1 mol of boron?

extremely easy	very easy	easy	neither easy nor difficult	difficult	very difficult	extremely difficult
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18. Silver coin weighing 9.70 g was dissolved in nitric acid. The reaction of dissolution is represented by the following chemical equation:



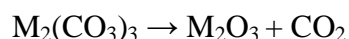
The whole silver from the solution is then precipitated as silver chromate by adding the saturated solution of potassium dichromate:



The mass of precipitate after drying was 13.88 g. Calculate the mass percentage of silver in the coin.

extremely easy	very easy	easy	neither easy nor difficult	difficult	very difficult	extremely difficult
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19. 23.4 g sample of trivalent metal carbonate was annealed and 6.72 dm³ of carbon dioxide (STP) was produced. Calculate the relative atomic mass of metal.



extremely easy	very easy	easy	neither easy nor difficult	difficult	very difficult	extremely difficult
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20. A sample of aluminum and copper alloy has a density of 1.13 g/cm³. Inserting the sample into the beaker with distilled water, the level of water increases by 9.70 cm³. Dissolving the sample in hydrochloric acid releases 6.72 dm³ of hydrogen measured under STP. Calculate the percentage of aluminum in the alloy. The reactivity series of metals table is given below.

K, Na, Ca, Mg, Al, Zn, Cr, Fe, Cd, Co, Ni, Sn, Pb, H, Cu, Hg, Ag, Pd, Pt, Au
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extremely easy	very easy	easy	neither easy nor difficult	difficult	very difficult	extremely difficult
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