



MULTIPLE CHOICE TEST WITH A SINGLE CORRECT ANSWER
(Answer by checking **only one** of the answers offered under A, B, C or D)

Part I

- A syringe is filled with gas and its opening is closed. In which of the following cases will the gas pressure decrease?
 - If the plunger is pulled up.
 - If the plunger is pushed down.
 - If the syringe is put in cold water.
 - If the syringe is put in hot water.
 - Only in I.
 - Only in IV.
 - In II and IV.
 - In I and III.
- How many hydrogen atoms, altogether, are there in three molecules of water and two molecules of nitric acid?
 - 5.
 - 10.
 - 8.
 - 12.
- In which of the following pairs of compounds, sulphur has the same valence?
 - H₂S and SO₂.
 - SO₂ and SO₃.
 - H₂S and MgS.
 - SO₂ and FeS.
- In which of the following sequences are all formulae of calcium compounds written correctly?
 - Ca(OH)₂ Ca(NO₃)₂ CaS CaCl₂ CaCO₃
 - Ca(OH)₂ CaNO₃ CaSO₄ CaCl₂ CaO
 - CaBr₂ CaSO₄ CaO CaCO₃ Ca(OH)₂
 - CaCl Ca(SO₄)₂ CaO Ca₂S CaCl₂
 - Only in I.
 - In I and in III.
 - Only in III.
 - In II and in IV.
- Which of the following statements is NOT correct?
 - During the chemical changes, more complex substances are always obtained than the starting ones.
 - Substances in all three aggregate states can participate in chemical processes.
 - Physical changes always occur during chemical changes.
 - Physical changes are not necessarily accompanied by chemical changes.
- Which of the following metals reacts with steam and forms oxide of the metal and hydrogen?
 - Copper.
 - Sodium.
 - Magnesium.
 - Calcium.
- During the reaction of aluminum nitrate dissolved in water and potassium hydroxide dissolved in water, a white precipitate appears. What is the correct formula of the precipitate formed?
 - KNO₃
 - KNO
 - Al(OH)₂
 - Al(OH)₃
- During the reaction of sodium and water, what is released?
 - Oxygen.
 - Hydrogen.
 - Sodium oxide.
 - Carbon dioxide.
- Nitrates are:
 - oxides of sodium.
 - salts of nitric acid.
 - nitrogen oxides.
 - insoluble salts of nitrous acid.
- What is the missing reactant in the following textual equation?
_____ + sulfuric acid → magnesium sulfate + water
 - Mg
 - MgCl₂
 - MgO
 - MgH₂



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11. What are the products obtained in the reaction of sodium carbonate and hydrochloric acid?
- A. NaCl, CO₂ and H₂
 - B. NaCl, CO₂ and H₂O**
 - C. Na₂O, CO₂ and H₂O
 - D. NaCl and CO₂
12. By which of the following reactions can a salt be obtained?
- A. A reaction between active metal and hydroxide.
 - B. A reaction between active metal and water.
 - C. A reaction between metal and acid.**
 - D. Combustion reaction of elemental substance in air.
13. What is NOT correct about the bases?
- A. The bases are slimy to the touch.
 - B. A base can react with a metal salt to give a hydroxide.
 - C. The bases do not react with sulfuric acid.**
 - D. Bases are solutions of some hydroxides in water.
14. In which of the following sequences only formulae of salts are written?
- A. CaCl₂, NaNO₃, MgSO₄, K₂CO₃.**
 - B. KOH, MgCl₂, Li₂CO₃, Ca(NO₃)₂.
 - C. AlCl₃, HF, NaBr, CaSO₄.
 - D. MgCO₃, HNO₃, NH₃, KI.
15. A solution of a substance had pH = 3. When a solution of another substance was added to this solution, the color of the universal indicator turned blue. What could the substance that was added be?
- A. Calcium hydroxide.**
 - B. Vinegar.
 - C. Sodium chloride.
 - D. Sulfuric acid.



Part II

1. Air is a mixture of gases in which the most abundant, then oxygen, argon, carbon dioxide and others. The boiling temperatures (points) of nitrogen, oxygen and argon, are as follows:

Substance	$t_b.$ / °C
Nitrogen	- 196
Oxygen	- 183
Argon	- 186

According to these data, answer the following questions:

A. In what aggregate state will these substances be, if they are cooled from room temperature to $-185\text{ }^\circ\text{C}$?

Nitrogen is in gaseous aggregate state.

Oxygen is in liquid aggregate state.

Argon is in gaseous aggregate state.

B. Which gas will begin to separate first during the distillation of a liquid mixture of these three substances? Answer: Nitrogen.

C. By how many centigrades must the room temperature ($25\text{ }^\circ\text{C}$) be lowered to reach the boiling point of oxygen? Answer: by 208 °C.

5 points in total (1 point for each correct answer)

2. Fill the blanks in the following table:

Record	Quantitative meaning for the record	Number of atoms of each element
3 P ₄	Three molecules of phosphorus	<u>12 P</u>
<u>5 H₂SO₄</u>	Five molecules of sulfuric acid	<u>10 H, 5 S, 20 O</u>
2 HCl	<u>Two molecules of hydrogen chloride</u>	<u>2 H, 2 Cl</u>
<u>3 NO₂</u>	Three molecules of nitrogen dioxide	3 N, 6 O

6 points in total (1 point for each correct answer)



3. The valence of the atom of a chemical element X is variable, and it can be I, II, III, IV, and V. Write the formulae of the oxides of this element in which its valence is I, IV, and V, and also of the hydrogen compound in which its valence is III.

Answer:



4 points in total (1 point for each correct answer)

3. Fill the blanks in the following table:

The formula of the compound	The names of the consisting elements in the compound	The name of the compound
$Al(OH)_3$	aluminium, oxygen, hydrogen	aluminium hydroxide
K_2SO_4	potassium, sulfur, oxygen	potassium sulfate
LiF	lithium, fluorine	lithium fluoride
H_3PO_4	hydrogen, phosphorus, oxygen	phosphoric acid
PbO_2	lead, oxygen	lead(IV) oxide

5 points in total (0.5 points for each correct answer)