THE RELATIONSHIP BETWEEN LEARNING STYLES AND STUDENTS`

CHEMISTRY ACHIEVEMENT

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Appendix I

Chemistry Knowledge Test

1. Which of the given substances represents an element? Mark the correct answer.

    a) hemoglobin

    b) iron

    c) blood

    d) air

    e) carbon(IV) oxide

2. How many valence electrons are there in the atom of the element with the following electronic configuration: $1s^2 2s^2 2p^6 3s^2 3p^3$?

    a) 2

    b) 3

    c) 5

    d) 6

    e) 15

3. The number of which of the following particles determines the atomic number of the element?

    a) electrons

    b) protons

    c) neutrons

   d) nucleons

    e) electrons, protons and neutrons

4. Isotopes are the atoms of the same element which differ in the number of neutrons in their nuclei. Which of the following pairs of elements are isotopes?

   a) $^{12}_{6}E$ and $^{24}_{12}E$ b) $^{25}_{12}E$ and $^{14}_{7}E$

   c) $^{14}_{7}E$ and $^{14}_{6}E$ d) $^{12}_{6}E$ and $^{13}_{6}E$

5. Which of the following series comprises formulas of compounds which contain only ionic bond?

   a) CCl_4, $FeCl_3$, MgO, NH_3

   b) $FeCl_2$, $AlCl_3$, Na_2O, HBr

   c) MgO, $MgCl_2$, CCl_4, CaO

   g) $FeCl_3$, Na_2O, CaO, HCl

   d) $AlCl_3$, $BaCl_2$, $FeCl_3$, K_2S

6. Circle the letter in front of the chemical formula of a compound which produces an acidic reaction when dissolved in water.

   a) NH_3

   b) NH_4Cl

   c) $NaNO_3$

   d) $NaHCO_3$

   e) Na_2S

7. The molar mass unit is:

   a) g

   b) mol

   c) g/mol

   d) no unit

8. Calculate the mass of water needed for the preparation of 200 g of 10% sodium chloride solution. Which answer is correct?

   a) 20 g

   b) 180 g

   c) 100 g

   d) 90 g

9. In the body, energy is stored by the creation of an ATP resulting from a chemical reaction $ADP + H_3PO_4 \rightarrow ATP + H_2O$, $\Delta H = 38$ kJ/mol. This reaction is:

a) endothermic

b) exothermic?

10. Acid rainfalls, which are increasingly endangering the plant and animal world on Earth, originate mostly from SO_2 and NO_2. One of the procedures for removing SO_2 from gases from industrial plants is to pass them over a moist limestone, which leads to formation of calcium-sulfite, according to the following chemical reaction:

$$CaCO_3 + SO_2 \rightarrow CaSO_3 + CO_2$$
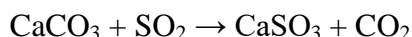
Calculate the volume of SO_2 (normal conditions) that is removed from smoke if 0.5 mol of carbon(IV) oxide is formed in the reaction?

a) 22.4 dm^3

b) 11.2 dm^3

c) 50.0 dm^3

d) 2.24 dm^3

11. The electronic configuration of an element is $1s^2 2s^2 2p^6 3s^2 3p^4$. Round the letter in front of the true statement.

a) Atom of this element has 4 valence electrons.

b) s and p sublevels of this atom are fully occupied.

c) This element belongs to the 14 (IVA) group of the Periodic table.

d) This element belongs to the third periode of the Periodic table.

12. Which of the given chemical equations does **not** represent a redox process?

a) $Ca + 2H_2O \rightarrow Ca(OH)_2 + H_2$

b) $Ca + F_2 \rightarrow CaF_2$

c) $HCl + NaOH \rightarrow NaCl + H_2O$

d) $Fe_2O_3 + 2Al \rightarrow 2Fe + Al_2O_3$

13. Oxidation state of nitrogen in $Fe(NO_3)_3$ is:

a) -5   b) -3   c) -2   d) +2   e) +3   f) +5

14. In 0.5 mol of oxygen molecules there are:

   a) $6 \cdot 10^{23}$ molecules.

   b) $3 \cdot 10^{23}$ molecules.

   c) $3 \cdot 10^{-23}$ molecules

   d) $6 \cdot 10^{13}$ molecules.

15. Elements found in the same group of the Periodic table:

   a) have the same number of electrons in their atoms

   b) have the same number of valence electrons in their atoms

   c) are found in nature only in the elementary state

   d) have the same state (solid, liquid or gaseous)

16. The reaction rate of synthesis of NO, represented by the following equation:

   $$4NH_3(g) + 5O_2(g) \rightarrow 6H_2O(g) + 4NO(g), \qquad \Delta_r H° < 0$$
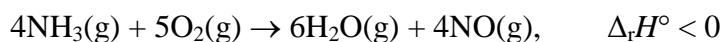
   can be increased:

   a) by adding nitrogen into the reaction mixture

   b) by increasing temperature

   c) by cooling of the reaction system

   d) by reducing concentrations of the reactants

17. In the reaction of thesynthesis of ammonia from the elements, under certain conditions the equilibrium mixture contains 0.1 mol N_2, 0.2 mol H_2 and 0.8 mol NH_3 in a 1 dm^3 vessel. The numerical value of the equilibrium constant of this reaction is:

   a) 0.00125   b) 32000   c) 800   d) 0.025