1. How are potassium atoms and calcium atoms similar?

   A same number of valence electrons

   B same oxidation number

   C same number of protons

   D same number of energy levels

2. An element on the far left side of the periodic table will have what property?

   A a tendency to avoid reactions

   B a tendency to share electrons when reacting

   C a tendency to gain electrons when reacting

   D a tendency to lose electrons when reacting

3. Which elements would ***most likely*** react with Group 2 (2A) metals?

   A alkali metals

   B halogens

   C noble gases

   D transition metals

4. Which elements are in the same period?

   A lead and sodium

   B oxygen and helium

   C silver and tin

   D tin and lead

5. Which compound is formed when aluminum bonds with fluorine?

   A AlF

   B AlF_2

   C AlF_3

   D Al_3F

6. Which pair of elements will ***most readily*** form a compound?

   A Li and Ne

   B Li and F

   C Li and Be

   D Li and B

7. Which compound is ***most likely*** formed using covalent bonds?

A SiO_2

B K_2O

C KBr

D $CaBr_2$

---

8. A teacher demonstrates a decomposition reaction. Which would be a correct demonstration?

A burning magnesium in the presence of oxygen to produce magnesium oxide

B burning methane in the presence of oxygen to produce carbon dioxide and water

C running an electrical current through water to produce hydrogen and oxygen

D reacting iron with oxygen to produce iron(III) oxide

---

9. Which equation represents a double replacement reaction?

A $2KClO_3 \rightarrow 2KCl + 3O_2$

B $CaBr_2 + Na_2CO_3 \rightarrow CaCO_3 + 2NaBr$

C $Zn + S \rightarrow ZnS$

D $2Li + FeBr_2 \rightarrow 2LiBr + Fe$

10. A chemical reaction is represented by this equation.

$$2Fe_2O_3 \rightarrow 4Fe + 3O_2$$

What is a product of this chemical reaction?

A FeO

B F

C O_2

D Fe_2O_3

---

11. Which is a correctly balanced chemical equation?

A $K_2CO_3 + BaCl_2 \rightarrow KCl + BaCO_3$

B $K_2CO_3 + BaCl_2 \rightarrow 2KCl + BaCO_3$

C $K_2CO_3 + 2BaCl_2 \rightarrow 2KCl + BaCO_3$

D $K_2CO_3 + 2BaCl_2 \rightarrow KCl + 2BaCO_3$

12. The reaction of CaO and water is exothermic. A student mixes the two chemicals in a test tube and touches the side of the test tube. Which statement describes the student's observation?

    A The test tube becomes hot as heat is released.

    B The test tube becomes hot as heat is absorbed.

    C The test tube becomes cold as heat is released.

    D The test tube becomes cold as heat is absorbed.

13. Solutions of lead(II) nitrate and potassium dichromate are mixed. The solution turns cloudy and yellow. Solid yellow particles fall to the bottom of the beaker. Which statement ***best*** describes this reaction?

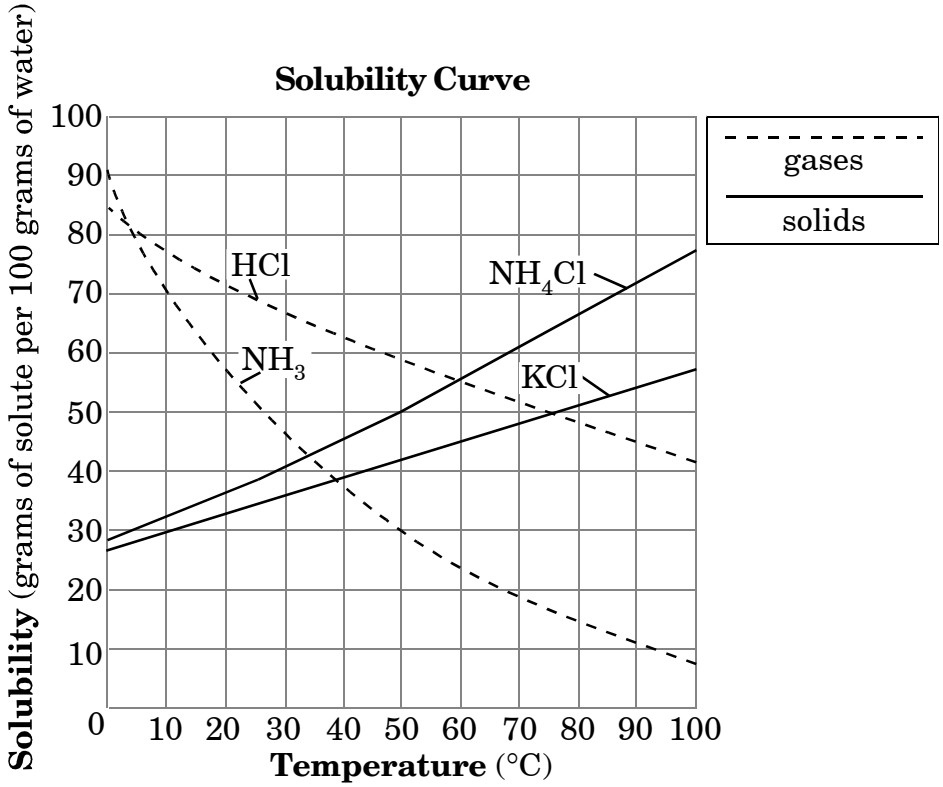
    A A precipitate formed.

    B A gas formed.

    C The reaction is exothermic.

    D The reaction is endothermic.

14.



Which solute exhibits the ***least*** response to temperature change?

A NH_4Cl

B KCl

C HCl

D NH_3

15. In an experiment, a researcher collected the following information about a solution made from a certain food:

- pH = 3
- taste = sour
- reactivity = reacts with metals

Based on the information, what ***best*** describes this solution?

A acid

B base

C salt

D neutral

---

16. This is a pH chart of common materials.

Which substance is the ***most basic***?

A Cola

B Cheese

C Baking Soda

D Bleach

17. Which action would ***most effectively*** slow down the dissolving of a sugar cube in water?

A cooling the water

B crushing the sugar

C heating the water

D stirring the water

18. Which substance in water will conduct electricity?

A corn starch

B salt

C sugar

D vegetable oil

19. The loss of an alpha particle has what effect on the atomic number and mass number of an atom?

A Atomic number and mass number both decrease.

B Atomic number increases; mass number decreases.

C Atomic number decreases; mass number increases.

D Atomic number and mass number both increase.

20. Which ***best*** contrasts nuclear fission and nuclear fusion?

A fission: splitting of small nuclei
fusion: joining of large nuclei

B fission: splitting of large nuclei
fusion: joining of small nuclei

C fission: joining of small nuclei
fusion: joining of large nuclei

D fission: needs extremely low temperatures
fusion: needs slightly higher temperatures than fission

End of Goal 6 Sample Items

EOC Physical Science Goal 6
Sample Items Key Report

1 **Objective: 6.01**
Analyze the periodic trends in the physical and chemical properties of elements.
a. Groups (families).
b. Periods.
Thinking Skill: Applying **Correct Answer:** D

2 **Objective: 6.01**
Analyze the periodic trends in the physical and chemical properties of elements.
a. Groups (families).
b. Periods.
Thinking Skill: Applying **Correct Answer:** D

3 **Objective: 6.01**
Analyze the periodic trends in the physical and chemical properties of elements.
a. Groups (families).
b. Periods.
Thinking Skill: Analyzing **Correct Answer:** B

4 **Objective: 6.01**
Analyze the periodic trends in the physical and chemical properties of elements.
a. Groups (families).
b. Periods.
Thinking Skill: Applying **Correct Answer:** C

5 **Objective: 6.02**
Investigate and analyze the formation and nomenclature of simple inorganic compounds.
a. Ionic bonds (including oxidation numbers).
b. Covalent bonds.
c. Metallic bonds.
Thinking Skill: Applying **Correct Answer:** C

6 **Objective: 6.02**
Investigate and analyze the formation and nomenclature of simple inorganic compounds.
a. Ionic bonds (including oxidation numbers).
b. Covalent bonds.
c. Metallic bonds.
Thinking Skill: Analyzing **Correct Answer:** B

7 **Objective: 6.02**
Investigate and analyze the formation and nomenclature of simple inorganic compounds.

a. Ionic bonds (including oxidation numbers).
b. Covalent bonds.
c. Metallic bonds.
Thinking Skill: Analyzing **Correct Answer:** A

8 **Objective: 6.03**
Identify the reactants and products of chemical reactions and balance simple equations of various types:
a. Single replacement.
b. Double replacement.
c. Decomposition
Thinking Skill: Applying **Correct Answer:** C

9 **Objective: 6.03**
Identify the reactants and products of chemical reactions and balance simple equations of various types:
a. Single replacement.
b. Double replacement.
c. Decomposition
Thinking Skill: Applying **Correct Answer:** B

10 **Objective: 6.03**
Identify the reactants and products of chemical reactions and balance simple equations of various types:
a. Single replacement.
b. Double replacement.
c. Decomposition
Thinking Skill: Applying **Correct Answer:** C

11 **Objective: 6.03**
Identify the reactants and products of chemical reactions and balance simple equations of various types:
a. Single replacement.
b. Double replacement.
c. Decomposition
Thinking Skill: Applying **Correct Answer:** B

12 **Objective: 6.04**
Measure and analyze the indicators of chemical change including:
a. Development of a gas.
b. Formation of a precipitate.
c. Release/absorption of energy (heat or light).
Thinking Skill: Knowledge **Correct Answer:** A

13 **Objective: 6.04**
Measure and analyze the indicators of chemical change including:
a. Development of a gas.
b. Formation of a precipitate.
c. Release/absorption of energy (heat or light).
Thinking Skill: Applying **Correct Answer:** A

14 **Objective: 6.05**
Investigate and analyze the properties and composition of solutions:
a. Solubility curves.
b. Concentration.
c. Polarity.
d. pH scale.
e. Electrical conductivity.
Thinking Skill: Analyzing **Correct Answer:** B

15 **Objective: 6.05**
Investigate and analyze the properties and composition of solutions:
a. Solubility curves.
b. Concentration.
c. Polarity.
d. pH scale.
e. Electrical conductivity.
Thinking Skill: Analyzing **Correct Answer:** A

16 **Objective: 6.05**
Investigate and analyze the properties and composition of solutions:
a. Solubility curves.
b. Concentration.
c. Polarity.
d. pH scale.
e. Electrical conductivity.
Thinking Skill: Analyzing **Correct Answer:** D

17 **Objective: 6.05**
Investigate and analyze the properties and composition of solutions:
a. Solubility curves.
b. Concentration.
c. Polarity.
d. pH scale.
e. Electrical conductivity.
Thinking Skill: Analyzing **Correct Answer:** A

18 **Objective: 6.05**

Investigate and analyze the properties and composition of solutions:
a. Solubility curves.
b. Concentration.
c. Polarity.
d. pH scale.
e. Electrical conductivity.
Thinking Skill: Knowledge **Correct Answer:** B

19 **Objective: 6.06**
Describe and explain radioactivity and its practical application as an alternative energy source:
a. Alpha, beta, and gamma decay and/or nuclear waste.
b. Fission and/or Fusion.
c. Energy will not spontaneously flow from a lower temperature to a higher temperature.
d. Synthesis.
Thinking Skill: Knowledge **Correct Answer:** A

20 **Objective: 6.06**
Describe and explain radioactivity and its practical application as an alternative energy source:
a. Alpha, beta, and gamma decay and/or nuclear waste.
b. Fission and/or Fusion.
c. Energy will not spontaneously flow from a lower temperature to a higher temperature.
d. Synthesis.
Thinking Skill: Analyzing **Correct Answer:** B