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CHAPTER 4

TEKS/TAKS TEST PREPARATION FOR SCIENCE

Practice Test A TEKS

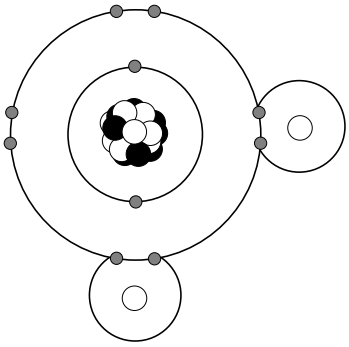
1 A sulfur atom must gain two electrons to have a filled outermost energy level. Which statement describes an atom from an element in the same group as sulfur?

A It has six valence electrons.

B It loses six electrons.

C It loses two electrons.

D It has two valence electrons.



2 The picture above shows a model of a molecule. Which of the following cannot be determined from the model?

F The number of atoms in the molecule

G The number of electrons in each atom

H The type of bonds joining the atoms

J The physical state of the substance

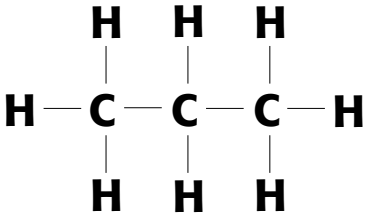
3 An ad for the antacid Fizzo claims that Fizzo relieves heartburn twice as fast as another leading brand. Which of the following is a reasonable inference from the ad?

A Fizzo has more flavorings than the other brand.

B Fizzo has half as much base per tablet than the other brand.

C Fizzo uses a stronger base than the other brand.

D Not Here



4 The picture above shows a model of a molecule of an organic compound. Which of the following is a limitation of this model?

F It does not show which atoms compose the molecule.

G It does not show the correct shape of the molecule.

H It does not show the type of bonds in the molecule.

J It does not show all of the bonds in the molecule.

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CHAPTER 4 TEKS/TAKS TEST PREPARATION FOR SCIENCE

Practice Test B TEKS

1 When an atom loses an electron, it becomes a
- **A** neutral atom.
- **B** neutral ion.
- **C** positive ion.
- **D** negative ion.

Ions and Their Charges

Name	Charge	Symbol
Sodium	$1+$	Na^{+}
Calcium	$2+$	Ca^{2+}
Aluminum	$3+$	Al^{3+}
Chloride	$1-$	Cl^{-}
Oxide	$2-$	O^{2-}

2 Look at the chart above, which shows some ions and their charges. According to the chart, an aluminum ion has
- **F** 3 electrons.
- **G** 3 protons.
- **H** 3 fewer protons than electrons.
- **J** 3 more protons than electrons.

3 According to the chart above, the oxide ion has
- **A** 2 more protons than electrons.
- **B** 2 fewer protons than electrons.
- **C** 2 protons.
- **D** an equal number of protons and electrons.

4 During a laboratory experiment, Juanita observes a model of two bonded atoms. She is told that the atoms are both nonmetals. Which of the following is a valid conclusion?
- **F** She is looking at a model of a covalent bond.
- **G** She is looking at a model of an acid.
- **H** She is looking at a model of an ionic bond.
- **J** She is looking at a model of a salt.

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Common Acids and Their Uses

Name of Acid	Formula	Uses
Acetic Acid (vinegar)	CH_3COOH	Seasons and preserves foods, cleans and deodorizes
Hydrochloric acid	HCl	Produced by stomach and aids digestion, used in toilet-bowl cleaners and for cleaning metal surfaces
Sulfuric acid	H_2SO_4	Used in automobile batteries and in making fertilizers, dyes and plastics
Nitric acid	HNO_3	Used in making explosives and fertilizers
Phosphoric acid	H_3PO_4	Removes hard water deposits, used in making fertilizer
Carbonic acid	H_2CO_3	Formed in carbonated drinks

5 The chart above lists some common acids and their uses. According to the chart, which acid is used in automobile batteries?

A Acetic acid
B Sulfuric acid
C Hydrochloric acid
D Phosphoric acid

6 According to the chart above, which of the following is true of hydrochloric acid?

F It can be used to season and preserve food
G It can remove hard-water deposits
H It can be formed in carbonated drinks
J It can aid in digestion

7 Why would an antacid, such as aluminum hydroxide, be used to treat heartburn?

A The basicity of aluminum hydroxide would neutralize the acidity of the stomach.
B Aluminum hydroxide is an acid that neutralizes the basicity of the stomach.
C Aluminum hydroxide is a salt that neutralizes the basicity of the stomach.
D Not Here

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8 During a laboratory experiment, Carlos is given a solution that has a pH of 10. Which of the following is a valid conclusion?

F The solution will turn blue litmus paper red.

G The solution will taste sour.

H The solution is a base.

J The solution won't conduct an electric current.

9 Carlos also determined that normal rainfall is slightly acidic. This means that its pH should be

A between 8 and 9.

B between 2 and 4.

C less than 3.

D between 6 and 7.

10 Jacques is going to perform a laboratory experiment with organic compounds. He can conclude that all the organic compounds he will study must contain

F hydrogen.

G carbon.

H oxygen.

J nitrogen.

11 After every laboratory experiment Dina performed, she threw away all her equipment, including beakers, test tubes, and Petri dishes. How should Dina change her laboratory practices?

A She should not change her practices. The equipment may have contained harmful acids and bases and should be disposed of.

B She should recycle her equipment so it can get made into new equipment.

C She should save her equipment and leave it dirty so she doesn't waste water.

D She should clean and reuse her equipment to save the Earth's resources.

12 The formula for water is H_2O. What is the chemical composition of water?

F One atom of hydrogen and one atom of oxygen

G Two atoms of hydrogen and two atoms of oxygen

H One atom of hydrogen and two atoms of oxygen

J Two atoms of hydrogen and one atom of oxygen

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pH Values for Common Substances

Substance	pH
Hydrochloric acid	1
Lemon	2
Apple	3.2
Tomato	4
Banana	4.7
Milk	6.3
Water	7.0
Blood	7.4
Soap	11.5
Ammonia	12

13 The chart above shows the pH values for some common substances. They were determined during an experiment. According to the chart, which substance is neutral?

A Milk
B Banana
C Water
D Soap

14 Look at the chart above. How would blood be classified?

F Weak base
G Strong base
H Weak acid
J Strong acid

15 Mimi observed during an experiment that a substance is a solid at room temperature, has a high melting point, and dissolves easily in water. Which of the following is a valid conclusion about this substance?

A The substance is an acid.
B The substance is an ionic compound.
C The substance is a base.
D The substance is a covalent compound.

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16 During an experiment, Kyoko is given an unknown solution. She must determine the solution's pH. What is the best way to determine an unknown solution's pH?

F Use a paper strip that contains several indicators.

G Use red litmus paper.

H Taste the solution to see whether it is sour or bitter

J Touch the solution to see if it feels slippery.

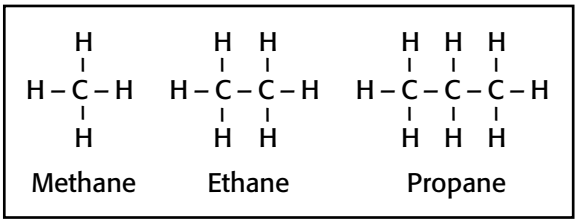
17 Which subatomic particles compose the nucleus of an atom?

A Electrons and neutrons

B Protons and electrons

C Protons and neutrons

D Protons and ions



18 Look at the models above. Johanna drew the diagrams of methane, ethane, and propane molecules above based on a laboratory experiment. She knows that methane is an organic compound. She can conclude that molecules of methane are held together by

F a crystal lattice.

G acid bonds.

H covalent bonds.

J ionic bonds.

19 During an experiment, Monique observed that an oil was not soluble in water. Which of the following is a valid conclusion?

A The oil is a covalent compound because it does not dissolve in water.

B The oil is an ionic compound because it does not dissolve in water.

C The oil is neutral because it does not dissolve in water.

D The oil must conduct electricity well because the oil is an ionic compound.

CHAPTER 4 TEKS/TAKS TEST PREPARATION FOR SCIENCE

Answer Key and TAKS Doctor for Practice Test A

Answers	TEKS Correlation	TAKS Objectives
1 A	8.8A, 8.9B	4
2 J	8.3C	1
3 C	8.3B	
4 G	8.3C	1

TAKS Doctor

The following TAKS questions have been diagnosed by the TAKS Doctor. Find out what might be causing your "ailing" answers. The TAKS Doctor will see you now!

Item 1 *asks students to identify atoms of elements in the same group.*

A **Correct.** An atom that needs to gain two electrons to have a filled outermost energy level must have six valence electrons. So atoms of elements in the same group as sulfur have six valence electrons.

B **Incorrect.** Gaining two electrons is not equivalent to losing six electrons. Atoms of elements in the same group as sulfur have six valence electrons, but the atoms do not lose the electrons.

C **Incorrect.** This answer describes the opposite electron transfer from a sulfur atom. Atoms of elements in the same group as sulfur gain two electrons to have a filled outer energy level.

D **Incorrect.** Students may incorrectly choose this item if they confuse sulfur's gaining two electrons to have a filled outermost energy level with the number of valence electrons sulfur has.

Item 4 *asks students to identify a limitation of a model.*

F **Incorrect.** The model shows that the molecule is composed of eight hydrogen atoms and three carbon atoms.

G **Correct.** A structural formula cannot show the actual three-dimensional shape of a molecule.

H **Incorrect.** The model shows the types of bonds that are in the molecule. Chemical bonds are represented by lines—a single bond is represented by a single line, a double bond is represented by two lines, and a triple bond is represented by three lines.

J **Incorrect.** The chemical bonds are represented by lines in the model. Each carbon has four bonds and each hydrogen has one bond.

Answer Key and TAKS Doctor for Practice Test B

Answers	TEKS Correlation	TAKS Objectives	Answers	TEKS Correlation	TAKS Objectives
1 C	8.8B	4	**11** D	8.1B	
2 J	8.8B	4	**12** J	8.8B	4
3 B	8.8B	4	**13** C	8.2C	1
4 F	8.2D	1	**14** F	8.2C	1
5 B	8.9D	4	**15** B	8.2D	1
6 J	8.9D	4	**16** F	8.1A	1
7 A	8.9D	4	**17** C	8.8B	4
8 H	8.2D	1	**18** H	8.2D	1
9 D	8.2C	1	**19** A	8.2D	1
10 G	8.2D	1			

TAKS Doctor

The following TAKS questions have been diagnosed by the TAKS Doctor. Find out what might be causing your "ailing" answers. The TAKS Doctor will see you now!

Item 4 *asks students to determine which conclusion is valid based on a passage describing a laboratory experiment.*

F **Correct.** When nonmetals bond together, the bond formed is covalent.

G **Incorrect.** Using the information in the question, one cannot conclude that the model is an acid.

H **Incorrect.** A nonmetal and a metal can form an ionic bond. The question states that the atoms are nonmetals, so this answer is incorrect.

J **Incorrect.** Using the information in the passage, one cannot conclude that the model is a salt.

Item 7 *asks students to determine why aluminum hydroxide can be used to treat heartburn.*

A **Correct.** Aluminum hydroxide is a base; therefore, it could neutralize the acidity of the stomach.

B **Incorrect.** Aluminum hydroxide is a base, and the contents of the stomach are acidic.

C **Incorrect.** Aluminum hydroxide is a base, and the contents of the stomach are acidic.

D **Incorrect.** The correct answer is B.

Item 8 *asks students to make a conclusion about a solution with a pH of 10.*

F **Incorrect.** Acids turn blue litmus paper red, but acids also have pH values of less than 7.

G Incorrect. Acids have a sour taste. Bases have a bitter taste.

H Correct. Solutions with pH values of 10 are bases.

J Incorrect. Bases can conduct electricity.

Item 9 *asks students to determine what pH range the term slightly acidic corresponds to.*

A Incorrect. The pH values of slightly basic solutions occur in the pH range of 8–9.

B Incorrect. The pH values of very acidic solutions occur in the pH range of 2–4.

C Incorrect. Very acidic solutions have pH values that are less than 3.

D Correct. The pH values of slightly acidic solutions occur in the pH range of 6–7.

Item 10 *asks students to determine what element organic compounds must contain.*

F Incorrect. Many organic compounds contain hydrogen, but all organic compounds must contain carbon.

G Correct. All organic compounds must contain carbon.

H Incorrect. Many organic compounds contain oxygen, but all organic compounds must contain carbon.

J Incorrect. Many organic compounds contain nitrogen, but all organic compounds must contain carbon.

Item 15 *asks students to make a valid conclusion about a substance based on its properties.*

A Incorrect. Acids do dissolve in water. However, all of the properties listed are properties of ionic compounds, so this answer is not the best answer.

B Correct. All of these properties are properties of ionic compounds, such as sodium chloride.

C Incorrect. Bases do dissolve in water. However, all of the properties listed are properties of ionic compounds, so this answer is not the best answer.

D Incorrect. Covalent compounds have low melting points and do not dissolve well in water.

Item 16 *asks students to choose the safest way to determine a solution's pH.*

F Correct. This method can accurately determine pH without posing any risk to the person conducting the experiment.

G Incorrect. Red litmus paper will only detect the presence of a base, and would not give an accurate pH of the solution.

H Incorrect. No one should ever taste an unknown solution; it could be harmful or poisonous. Tasting the solution would also not yield a pH value.

J Incorrect. No one should touch an unknown substance, it could be corrosive or harmful to the skin. Touching the solution would also not yield a pH value.

Item 17 *asks students to determine which subatomic particles compose the nucleus of an atom.*

A **Incorrect.** The nucleus of any atom is composed of neutrons and protons. Electrons are usually found outside the nuclei of atoms.

B **Incorrect.** The nucleus of any atom is composed of neutrons and protons. Electrons are usually found outside the nuclei of atoms.

C **Correct.** The nucleus of any atom is composed of neutrons and protons.

D **Incorrect.** The nucleus of any atom is composed of neutrons and protons. Ions are charged particles that do not have the same number of protons and electrons.

Item 18 *asks students to determine the type of bond that holds molecules of methane together.*

F **Incorrect.** Methane is an organic compound. Organic compounds are made of molecules that are held together by covalent bonds. Ions in an ionic compound bond to form a crystal lattice.

G **Incorrect.** There is no bond called an acid bond.

H **Correct.** Methane is an organic compound. Organic compounds are made of molecules that are held together by covalent bonds.

J **Incorrect.** Ionic bonds occur in ionic compounds. Methane is an organic compound, not an ionic compound.