

**Guided Responses to TAKS Self-Check Exam Practice IPC TEKS 7A, 7D, and 7E
TX BDOL p TX17**

1. A gas in a sealed metal container is heated from 300 K to 900 K. If the initial pressure of the gas is P , the final pressure is _____.

(IPC 7A)
D) $3P$

Solution The pressure, temperature, and volume of a gas are related. Because the gas is in a sealed metal container, its volume is constant. Its temperature, measured in units of kelvins (K), is tripled. When the volume is kept constant, the pressure and temperature are proportional. This means if one increases or decreases, the other increases or decreases by the same factor. In this problem, since temperature triples, the pressure must triple. The final pressure is $3P$.

2. Which of the following is not a mixture?

(IPC 7E)
J) salt

Solution A mixture is a material made from two or more substances not chemically combined. Milk, wood, and apple juice are all composed of various types of molecules, so they are mixtures. Salt is made from just one type of molecule, NaCl. Salt is a compound. Each molecule of salt is composed of two elements that are bound together chemically.

3. Which of the following compounds is covalently bonded? **(IPC 7D)**

A) SiO_2

Solution Elements that combine by sharing electrons are covalently bonded. Nonmetal elements that are close together on the periodic table tend to bond covalently. CsF, NaCl, and CaCl_2 are composed of elements that are on opposite sides of the periodic table. Only SiO_2 is composed of elements that are near each other on the periodic table.

4. Which of the following is not a compound? **(IPC 7E)**

G) aluminum foil

Solution Water, salt, and plastic are compounds, because they are composed of

two or more elements that are chemically bound. Aluminum is an element. It is a substance in which all its atoms are alike.

5. Potassium gives up one electron when it forms an ionic bond. Its electron configuration then is the same as _____.

(IPC 7D)
D) argon

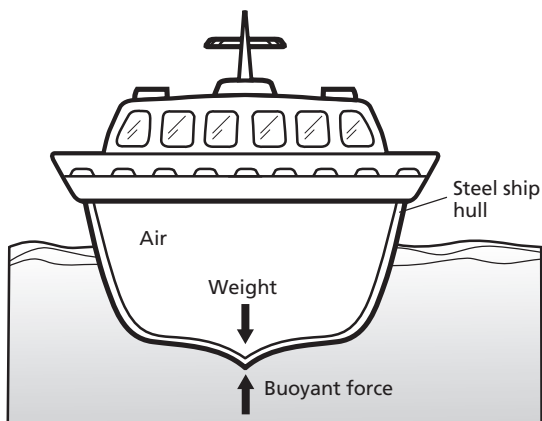
Solution Potassium has 19 electrons and is in group 1. All elements in group 1 have one electron in their outer energy level. When potassium gives up its outer electron to form a chemical bond, it then has 18 electrons and a stable electron configuration. The noble gas elements in group 18 have stable electron configurations. The noble gas element with 18 electrons is argon.

6. Which of the following best describes a bar of pure aluminum that contains a small particle of carbon? **(IPC 7E)**

H) heterogeneous mixture

Solution The bar is a mixture because it contains two different substances that are not chemically combined. In the bar, the two substances, aluminum and carbon, are not uniformly distributed because all the carbon is located only in the small particle. Therefore the bar is a heterogeneous mixture.

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In this problem, the mass is 300.0 grams, and the volume is 256 cubic centimeters. The density, then, is $(300.0 \text{ g}) / (256 \text{ cm}^3) = 1.17 \text{ g/cm}^3$. The density of a material is the same regardless of how much of the material you have. The density of 600 grams of the plastic, then, is also 1.17 g/cm^3 .

10. What is the chemical formula for magnesium fluoride? (IPC 7D)
F) MgF_2

Solution On the periodic table, the element magnesium is in group 2. Elements in group 2 have two outer electrons, and will form ionic bonds by giving up these two electrons. The element fluorine is in group 17. Elements in this group need only one more electron to have a complete filled outer level of electrons. Fluorine will form ionic bonds by accepting one electron. So two fluorine atoms are needed to accept the two electrons available from one magnesium atom, and the formula is MgF_2 .

7. Which of the following is not true about the figure above? (IPC 7A)
C) The weight of the part of the boat that is under water equals the buoyant force.

Solution Buoyancy is the upward force an object in a fluid experiences. The buoyant force equals the weight of the fluid displaced by the object. When the object's weight matches the buoyant force, the object floats. The object's weight is another name for the force of gravity on the object.

8. Which of the following would you expect to have the highest viscosity? (IPC 7A)
H) refrigerated honey

Solution Viscosity is the resistance of a fluid to flow. Viscosity of a liquid decreases if the liquid is heated. Viscosity increases if the liquid is cooled. The viscosity of honey, therefore, will increase if it is refrigerated.

9. A piece of plastic with a mass of 300.0 grams has a volume of 256.0 cubic centimeters. What would the density of a 600-gram piece of the plastic be? (IPC 7A)
C) 1.71 g/cm^3

Solution The density D , mass m , and volume V of a substance are related by this equation:

$$D = \frac{m}{V}$$