

Chemistry Diagnostic

Passage I

Throughout history, various species of plants have been touted as having medicinal properties. Some of these claims have been proven to be true, while others have been debunked. At times false claims are made by nefarious individuals seeking to defraud the public, but on other occasions these claims are made by mistaken, honest individuals. For these reasons, whenever drawing conclusions about medicinal or any other properties of a substance, it is essential to follow strict testing procedures before drawing a conclusion. One example of such a case is the bellybye plant.

The bellybye plant had been rumored to prevent heart disease for generations. However, no scientific study on the plant had been performed. To test the efficacy of the bellybye plant's prevention of heart disease a study was performed. Forty men between the ages of 35 and 45 were tested. Twenty men in the experimental group were given a daily

dose of the bellybye plant. The control group was not given the plant. Blood pressure, cholesterol levels, and heart rate of each test subject was monitored during the trial.

After 3 months, the trial was complete. The data strongly indicated that the bellybye plant had a positive impact on heart health. All participants who were given the plant were observed to have lower blood pressure, decreased LDL cholesterol, and lower heart rates.

1. What is the central point of the passage?

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2. A second test on the bellbye plant is being performed. Once again there are two groups. The first group consists of 20 men. The second group consists of 20 women?

What is likely being tested?

Explain your answer.

3. Of the atoms listed, which has the smallest atomic radius?

- a. A. potassium
- b. Francium
- c. rubidium
- d. cesium

4. In the wave-mechanical model of the atom, an orbital is defined as

- a. A region of the most probable proton location.
- b. A region of the most probable electron location.

- c. A circular path traveled by a proton around the nucleus.
- d. A circular path traveled by an electron around the nucleus.

5. O_2 is in container at standard STP. What will increase the pressure?

- a. an increase in temperature
- b. a decrease in the moles
- c. the temperature remaining constant.
- d. Changing the units of the constant

6. Which best describes the current atomic theory?

- a. Atoms consist of electrons circling in definite orbitals around a positive nucleus.
- b. Atoms are composed of electrons in a cloud around a positive nucleus.
- c. Atoms can easily be split, at which time they become radioactive.
- d. An atom's mass is determined by the mass of its neutrons.

7. In the balanced equation, how many moles of ammonia would there be?



- a. 2
- b. 3
- c. 6
- d. 1

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8. Gases consist of particles that
- are loosely packed.
 - are tightly packed.
 - move freely.
 - move slowly.

9. NO_2 and CO_2 are both
- Elements
 - Compounds
 - gas-liquid mixture
 - Liquid-solid mixtures

10. What does the law of conservation of mass state?
- Some mass is lost in chemical reactions.
 - Some mass is gained in chemical reactions.
 - Mass cannot be created or destroyed in chemical reactions.
 - There is no mass in chemical reactions.

11. What is the maximum amount of electrons that can be in an s orbital?

- 2
- 3
- 8
- 6

12. An Element is in group 17 on the periodic table. How many valence electrons does it have?

- 1
- 5
- 3
- 7

13. What is the noble gas (abbreviated) notation for sulfur?

- $[\text{Xe}]6s^2$
- $[\text{Ne}]3s^2p^4$
- $[\text{Ne}]3s^1$
- $[\text{Ne}]3s^2p^6$

14. The formula for density is mass divided by volume. Which instruments would you use to measure the density of a cube?

- balance and ruler
- balance and thermometer

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- c. balance and hot plate
- d. balance and test tube
15. For a class exercise, four students measured the distance across a section of highway. Each student made three measurements. Which student's measurements were most precise?
- 20.5 m, 20.6 m, 20.5
 - 30 m, 25 m, 28 m
 - 45 m, 40 m, 38 m
 - 20 m, 25 m, 19 m
16. A solution that contains the maximum amount of solute at a given temperature is
- Saturated
 - Unsaturated
 - Supersaturated
 - Frozen
17. Which of the following states that only two electrons with different spin can occupy a single orbital?
- Pauli exclusion principal
 - Hund's rule
 - Aufbau principal
 - Law of conservation of mass
18. What is the electron configuration for Li?
- $4s^24p^1$
- b. $1s^21p^6$
- c. $1s^21p^4$
- d. $1s^21p^1$
19. What is the name of the compound below? $MgCl_2$?
- Magnesium chlorine
 - Magnesium chlorous
 - Chlorine magnide
 - Magnesium chloride