Section 1: Development of the Atomic Theory Pages 82-87

THE BEGINNING OF ATOMIC THEORY

Circle the letter of the best answer for each question.

1. What does the word *atom* mean?
   a. “dividable”
   b. “invisible”
   c. “hard particles”
   d. “not able to be divided”

2. Why weren’t Democritus’s ideas accepted?
   a. Bohr did not agree with his theory.
   b. Dalton proved Democritus wrong.
   c. Aristotle did not agree with his theory.
   d. Rutherford proved Democritus wrong.

From Aristotle to Modern Science

3. What is the smallest particle into which an element can be divided?
   a. a nucleus
   b. a proton
   c. an atom
   d. a neutron

DALTON’S ATOMIC THEORY BASED ON EXPERIMENTS

4. Which of the following ideas was part of Dalton’s theories?
   a. All substances are made of atoms.
   b. Atoms can be divided.
   c. Atoms can be destroyed.
   d. Most substances are made of atoms.
Not Quite Correct

Circle the letter of the best answer for each question.

5. What happened in the late 1800s?
   a. Dalton created a new theory.
   b. Dalton disproved his own theory.
   c. Dalton’s theory was proved.
   d. Dalton’s theory changed.

THOMSON’S DISCOVERY OF ELECTRONS

Circle the letter of the best answer for each question.

6. What did Thomson discover about atoms?
   a. Atoms cannot be divided.
   b. There are small particles inside atoms.
   c. There are no small particles in atoms.
   d. All atoms have negative charges.

Read the words in the box. Read the sentences. Fill in each blank with the word or phrase that best completes the sentence.

<table>
<thead>
<tr>
<th>electrons</th>
<th>particles</th>
<th>positively</th>
</tr>
</thead>
</table>

7. Thomson discovered that a ____________________charged plate in a cathode-ray tube attracted an invisible beam.

8. Thomson concluded that the beam was made of ____________________that have negative electric charges.

9. The negatively charged particles Thompson discovered are called ____________________.
Like Plums in a Pudding

Circle the letter of the best answer for each question.

10. What did Thomson believe about electrons?
   a. They are mixed throughout an atom.
   b. They are in the center of an atom.
   c. They are positively charged.
   d. They are absent from an atom.

RUTHERFORD’S ATOMIC “SHOOTING GALLERY”

Surprising Results

11. What did Rutherford expect all the charged particles to do?
   a. to pass right through the gold foil
   b. to deflect to the sides of the gold foil
   c. to bounce straight back
   d. to become “blobs” of matter

WHERE ARE THE ELECTRONS?

12. Which of the following statements is NOT true of Rutherford’s results?
   a. Some of the particles turned to one side.
   b. Some of the particles did not move.
   c. Most of the particles passed through the gold foil.
   d. Some of the particles bounced straight back.

13. What did Rutherford realize about atoms?
   a. Atoms are mostly empty space.
   b. Atoms are helium.
   c. Atoms are gold particles.
   d. Atoms are large particles.
Far From the Nucleus

Circle the letter of the best answer for each question.

14. What positively charged part did Rutherford believe was in the center of an atom?
   a. an electron
   b. a nucleus
   c. a particle
   d. a proton

Bohr’s Electron Levels

15. What did Bohr study?
   a. the way atoms react to light
   b. the size of atoms
   c. the diameter of the nucleus
   d. the division of atoms

16. How did Bohr’s model propose that electrons move around the nucleus?
   a. a variety of ways
   b. haphazardly
   c. between the levels
   d. in certain paths

The Modern Atomic Theory

17. What model represents current atomic theory?
   a. electron-cloud model
   b. plum-pudding model
   c. Rutherford’s model
   d. Bohr’s model
Section 2: The Atom Pages 88-94

HOW SMALL IS AN ATOM?

Circle the letter of the best answer for the question.

18. Which of the following statements is true?
   a. A penny has about 20,000 atoms.
   b. A penny has more atoms than the Earth has people.
   c. Aluminum is made up of large-sized atoms.
   d. Aluminum atoms have a diameter of about 3 cm.

WHAT IS INSIDE AN ATOM?
The Nucleus

Read the description. Then, draw a line from the dot next to each description to the matching word.

19. particle with no electrical charge
   ● a. electron

20. particle that is positively charged
   ● b. nucleus
   c. proton

21. particle that is negatively charged
   ● d. neutron

22. part that contains most of the mass of an atom
   ● e. atomic mass unit

HOW DO ATOMS OF DIFFERENT ELEMENTS DIFFER?
Starting Simply

Read the words in the box. Read the sentences. Fill in each blank with the word or phrase that best completes the sentence.

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<table>
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</thead>
<tbody>
<tr>
<td>helium</td>
<td>hydrogen</td>
<td>electron</td>
</tr>
</tbody>
</table>

23. The simplest atom is the ________________ atom.

24. The simplest atom has one proton and one__________________.

25. If you build an atom using two protons, two neutrons, and two electrons, you have built an atom of__________________.
Building Bigger Atoms

| atomic mass unit | atomic number | neutrons |

26. An atom does not have to have equal numbers of protons and________________________.

27. The number of protons in the nucleus of an atom is the ____________________ of that atom.

28. The SI unit used to express the masses of particles in atoms is called the ____________________.

ISOTOPES

Circle the letter of the best answer for each question.

29. What do isotopes always have?
   a. the same number of protons
   b. the same number of neutrons
   c. a different atomic number
   d. the same mass

30. How are isotopes of the same element different?
   a. They have different numbers of protons.
   b. They have different numbers of neutrons.
   c. They have the same number of electrons.
   d. They have different numbers of ions.

Properties of Isotopes

31. Which phrase best describes radioactive isotopes?
   a. They are stable.
   b. They never change.
   c. They are unstable.
   d. They don’t produce energy.
Telling Isotopes Apart

32. What is the mass number of an isotope that has 5 protons, 6 neutrons, and 5 electrons?
   a. 1   b. 11   c. 10   d. 16

Naming Isotopes

33. Carbon has an atomic number of 6. How many neutrons does carbon-12 have?
   a. 12   b. 8   c. 6   d. 18

Calculating the Mass of an Element
Read the words in the box. Read the sentences. Fill in each blank with the word or phrase that best completes the sentence.

<table>
<thead>
<tr>
<th>mass number</th>
<th>atomic mass</th>
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34. The sum of the protons and neutrons in an atom is the ____________________.

35. The weighted average of the masses of all the naturally occurring isotopes of an element is the _________________.

FORCES IN ATOMS

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<tr>
<th>Strong force</th>
<th>Electromagnetic force</th>
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<tbody>
<tr>
<td>Weak force</td>
<td>Gravitational force</td>
</tr>
</tbody>
</table>

36. Protons stay together in the nucleus because of ____________________.

37. Objects are pulled toward one another because of ____________________.

38. An important force in radioactive atoms is ____________________.

39. The electrons are held around the nucleus because of ____________________.