

unit 4-5 test review

Matching

Match each item with the correct statement below.

- a. proton
- b. nucleus
- c. atom
- d. electron
- e. neutron

- 1. the smallest particle of an element that retains the properties of that element
- 2. a positively charged subatomic particle
- 3. a negatively charged subatomic particle
- 4. a subatomic particle with no charge
- 5. the central part of an atom, containing protons and neutrons

Match each item with the correct statement below.

- a. mass number
- b. atomic mass unit
- c. atomic number
- d. atomic mass
- e. isotope

- 6. atoms with the same number of protons, but different numbers of neutrons in the nucleus of an atom
- 7. the total number of protons and neutrons in the nucleus of an atom
- 8. the number of protons in the nucleus of an element
- 9. the weighted average of the masses of the isotopes of an element
- 10. amu = one-twelfth the mass of a carbon atom having six protons and six neutrons

Match each item with the correct statement below.

- a. electron
- b. group
- c. period
- d. metal
- e. transition metal

- 11. horizontal row in the periodic table
- 12. vertical column in the periodic table
- 13. weighs 0 amu
- 14. type of element that is a good conductor of heat and electric current
- 15. metals in the middle groups of the periodic table

Match each item with the correct statement below.

- a. alpha particle
- b. transmutation
- c. beta particle
- d. gamma radiation

- 16. conversion of an atom of one element to an atom of another element

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- 17. emitted helium nucleus
- 18. energetic electron from decomposed neutron
- 19. high-energy photons emitted by a radioisotope
- 20. particle of charge +1 and mass equal to that of an electron

Match each item with the correct statement below.

- a. fission
- b. fusion

- 21. splitting of nucleus into smaller fragments
- 22. combination of two nuclei to form a nucleus of greater mass

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- 23. The smallest particle of an element that retains the properties of that element is a(n) \_\_\_\_\_.
  - a. atom
  - b. electron
  - c. proton
  - d. neutron
- 24. Dalton's atomic theory included which idea?
  - a. All atoms of all elements are the same size.
  - b. Atoms of different elements always combine in one-to-one ratios.
  - c. Atoms of the same element are always identical.
  - d. Individual atoms can be seen with a microscope.
- 25. Which of the following is true about subatomic particles?
  - a. Electrons are negatively charged and are the heaviest subatomic particle.
  - b. Protons are positively charged and the lightest subatomic particle.
  - c. Neutrons have no charge and are the lightest subatomic particle.
  - d. The mass of a neutron nearly equals the mass of a proton.
- 26. Who conducted experiments to determine the quantity of charge carried by an electron?
  - a. Rutherford
  - b. Millikan
  - c. Dalton
  - d. Thomson
- 27. All atoms are \_\_\_\_\_.
  - a. positively charged, with the number of protons exceeding the number of electrons
  - b. negatively charged, with the number of electrons exceeding the number of protons
  - c. neutral, with the number of protons equaling the number of electrons
  - d. neutral, with the number of protons equaling the number of electrons, which is equal to the number of neutrons
- 28. The particles that are found in the nucleus of an atom are \_\_\_\_\_.
  - a. neutrons and electrons
  - b. electrons only
  - c. protons and neutrons
  - d. protons and electrons

29. As a consequence of the discovery of the nucleus by Rutherford, which model of the atom is thought to be true?  
 a. Protons, electrons, and neutrons are evenly distributed throughout the volume of the atom.  
 b. The nucleus is made of protons, electrons, and neutrons.  
 c. Electrons are distributed around the nucleus and occupy almost all the volume of the atom.  
 d. The nucleus is made of electrons and protons.
30. An element has an atomic number of 76. The number of protons and electrons in a neutral atom of the element are \_\_\_\_\_  
 a. 152 protons and 76 electrons      c. 38 protons and 38 electrons  
 b. 76 protons and 0 electrons      d. 76 protons and 76 electrons
31. The sum of the protons and neutrons in an atom equals the \_\_\_\_\_.  
 a. atomic number      c. atomic mass  
 b. nucleus number      d. mass number
32. What does the number 84 in the name krypton-84 represent?  
 a. the atomic number      c. the sum of the protons and electrons  
 b. the mass number      d. twice the number of protons
33. All atoms of the same element have the same \_\_\_\_\_.  
 a. number of neutrons      c. mass numbers  
 b. number of protons      d. mass
34. Isotopes of the same element have different \_\_\_\_\_.  
 a. numbers of neutrons      c. numbers of electrons  
 b. numbers of protons      d. atomic numbers
35. In which of the following sets is the symbol of the element, the number of protons, and the number of electrons given correctly?  
 a. In, 49 protons, 49 electrons      c. Cs, 55 protons, 132.9 electrons  
 b. Zn, 30 protons, 60 electrons      d. F, 19 protons, 19 electrons
36. Using the periodic table, determine the number of neutrons in  $^{16}\text{O}$ .  
 a. 4      c. 16  
 b. 8      d. 24
37. Which of the following sets of symbols represents isotopes of the same element?  
 a.  $^{91}_{42}\text{J}$ ,  $^{92}_{42}\text{J}$ ,  $^{93}_{40}\text{J}$       c.  $^{84}_{38}\text{M}$ ,  $^{87}_{38}\text{M}$   
 b.  $^{50}_{19}\text{L}$ ,  $^{50}_{20}\text{L}$ ,  $^{50}_{21}\text{L}$       d.  $^{138}_{55}\text{Q}$ ,  $^{133}_{54}\text{Q}$
38. How is the number of neutrons in the nucleus of an atom calculated?  
 a. Add the number of electrons and protons together.  
 b. Subtract the number of electrons from the number of protons.  
 c. Subtract the number of protons from the mass number.  
 d. Add the mass number to the number of electrons.

39. What unit is used to measure weighted average atomic mass?  
 a. amu      c. angstrom  
 b. gram      d. nanogram
40. What is another name for the representative elements?  
 a. Group A elements      c. Group C elements  
 b. Group B elements      d. transition elements
41. What is another name for the transition metals?  
 a. noble gases      c. Group B elements  
 b. Group A elements      d. Group C elements
42. Which of the following elements is in the same period as phosphorus?  
 a. carbon      c. nitrogen  
 b. magnesium      d. oxygen
43. The charge on a gamma ray is \_\_\_\_\_.  
 a. +2      c. 0  
 b. +1      d. -2
44. What particle is emitted in alpha radiation?  
 a. electron      c. helium nucleus  
 b. photon      d. hydrogen nucleus
45. A beta particle is a(n) \_\_\_\_\_.  
 a. photon      c. helium nucleus  
 b. electron      d. hydrogen nucleus
46. What is the change in atomic mass when an atom emits a beta particle?  
 a. decreases by 2      c. remains the same  
 b. decreases by 1      d. increases by 1
47. What is the change in atomic mass when an atom emits gamma radiation?  
 a. decreases by 2      c. remains the same  
 b. decreases by 1      d. increases by 1
48. The least penetrating form of radiation is \_\_\_\_\_.  
 a. beta radiation      c. alpha radiation  
 b. gamma radiation      d. X rays
49. Ionizing radiation that consists of helium nuclei is \_\_\_\_\_.  
 a. X radiation      c. beta radiation  
 b. gamma radiation      d. alpha radiation
50. What is the change in the atomic number when an atom emits an alpha particle?  
 a. decreases by 1      c. increases by 1  
 b. decreases by 2      d. increases by 2
51. What is the change in atomic number when an atom emits a beta particle?  
 a. decreases by 2      c. increases by 2  
 b. decreases by 1      d. increases by 1

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52. What is the change in atomic number caused by the emission of gamma radiation?  
 a. decreases by 2  
 b. decreases by 1  
 c. remains the same  
 d. increases by 1
53. Which symbol is used for an alpha particle?  
 a.  ${}^2_1\text{He}$   
 b.  ${}^4_2\text{He}$   
 c.  ${}^4_2\text{He}$   
 d.  ${}^4_2\text{He}$
54. Which of the following materials is necessary to stop an alpha particle?  
 a. three feet of concrete  
 b. three inches of lead  
 c. single sheet of aluminum foil  
 d. single sheet of paper
55. What symbol is used for beta radiation?  
 a.  ${}^0_0\text{e}$   
 b.  ${}^0_{-1}\text{e}$   
 c.  ${}^0_0\text{e}$   
 d.  ${}^0_{-1}\text{e}$
56. Which of the following materials is necessary to stop a beta particle?  
 a. three feet of concrete  
 b. three inches of lead  
 c. thin pieces of wood  
 d. single sheet of paper
57. Which of the following materials is most effective for stopping gamma radiation?  
 a. several cm of lead  
 b. one cm of water  
 c. single sheet of aluminum foil  
 d. single sheet of paper
58. What is the change in atomic mass number when an atom emits an alpha particle?  
 a. decreases by 2  
 b. decreases by 4  
 c. increases by 2  
 d. increases by 4
59. If an isotope decays by the process of beta emission, \_\_\_\_\_.  
 a. the mass number changes  
 b. the atomic number changes  
 c. protons are given off  
 d. the number of neutrons remains the same
60. What particle is needed to complete this nuclear reaction?  
 ${}^{222}_{86}\text{Rn} \rightarrow {}^{218}_{84}\text{Po} + \text{_____}$   
 a.  ${}^4_2\text{He}$   
 b.  ${}^0_0\text{e}$   
 c.  ${}^1_1\text{H}$   
 d.  ${}^1_0\text{n}$
61. When radium-226 (atomic number 88) decays by emitting an alpha particle, it becomes \_\_\_\_\_.  
 a. polonium-222  
 b. polonium-224  
 c. radium-222  
 d. radon-222

**Short Answer**

62. List the number of protons, neutrons, and electrons in  ${}^{12}_6\text{C}$ .