

Chap_8_13

Student: _____

1. John Dalton reasoned that atoms exist from the evidence that
 - A. there are numerous, tiny empty spaces in matter.
 - B. elements always combined in certain fixed ratios.
 - C. elements could not be broken down into simpler substances.
 - D. matter was homogeneous.
2. When Rutherford found that some of the alpha particles fired at the gold foil were widely deflected, he concluded that
 - A. gold was an element, not a compound as previously believed.
 - B. atoms are solid, with spaces between them.
 - C. atoms are electrically neutral.
 - D. the positive charge in an atom is concentrated in a tiny nucleus.
3. Rutherford concluded from his calculations that the volume of an atom
 - A. is filled with protons, neutrons and electrons.
 - B. is mostly protons, with electrons revolving around the outside.
 - C. is filled with electrons.
 - D. is mostly empty space.
4. The atomic number of an element is the number of
 - A. protons.
 - B. protons and neutrons.
 - C. protons and electrons.
 - D. all the particles in the atom.
5. Neutral atoms of a given element all have the same
 - A. number of protons.
 - B. atomic number.
 - C. number of electrons.
 - D. All of the above.
6. Atoms in an incandescent gas
 - A. emit all frequencies of light in a continuous spectrum.
 - B. emit different frequencies of light depending on its temperature.
 - C. emit characteristic frequencies of light.
 - D. absorb, rather than emit light.

7. The quantum mechanical model of the atom differs from the Bohr model in that it
- A. considers the electron as a particle.
 - B. considers the electron as a wave.
 - C. predicts the specific location of the electron in an atom.
 - D. states that electrons can only exist at specific distances from the nucleus.
8. The proposal that matter, like light, exhibits wave-like behavior was
- A. verified in diffraction experiments with a beam of electrons.
 - B. never tested since it was known to be impossible.
 - C. shown to be theoretically possible, but never verified by experiment.
 - D. verified by physical measurements of a moving baseball.
9. The energy of a photon of light emitted by an electron equals the
- A. energy of the level it currently occupies.
 - B. energy of the level it just left.
 - C. energy of the ground state of the atom.
 - D. difference in energy between two levels.
10. Photons of which of the following colors of light possess the greatest amount of energy?
- A. blue
 - B. green
 - C. yellow
 - D. red
11. Isotopes of an element are atoms that have
- A. the same number of protons, but a different number of electrons.
 - B. the same number of neutrons, but a different number of protons.
 - C. the same number of protons, but a different number of neutrons.
 - D. equal numbers of protons and neutrons.
12. Identify the number of protons, neutrons and electrons in an atom of ${}^{19}_{9}\text{F}$.
- A. 9 protons, 10 neutrons and 9 electrons
 - B. 9 protons, 10 neutrons and 10 electrons
 - C. 9 protons, 19 neutrons and 9 electrons
 - D. 10 protons, 9 neutrons and 10 electrons
13. This type of radiation is really the nucleus of a helium atom.
- A. alpha
 - B. beta
 - C. gamma
 - D. All of the above.

14. This type of radiation can easily pass through a human.
- A. alpha
 - B. beta
 - C. gamma
 - D. All of the above.
15. Nuclei with a higher than desired neutron-to-proton ratios tend to undergo which type of decay?
- A. alpha
 - B. beta
 - C. gamma
 - D. All of the above.
16. Isotope A has a half-life measured in minutes, whereas isotope B has a half-life of millions of years. Which is more radioactive?
- A. isotope A
 - B. isotope B
 - C. Both are equally dangerous.
 - D. It depends on the temperature of each.
17. The basic requirement for a fusion reaction is (are)
- A. temperature on the order of 100 million °C.
 - B. dense concentration of hydrogen nuclei.
 - C. confinement at 10 atmospheres pressure for at least one second.
 - D. All of the above.
18. A Geiger counter measures radiation indirectly by measuring
- A. flashes of light.
 - B. speaker static.
 - C. electrons released by ionization.
 - D. curies.
19. Reactor control rods are made of a substance that
- A. absorbs neutrons.
 - B. emits neutrons.
 - C. reflect neutrons.
 - D. slow down neutrons so they produce more fission.