

Chapters 9 and 12 Test Review
Physical Science – Matter

Name: Key Per:

1. What is thermal energy?

Energy (heat) that moves from high to low temp.

2. Describe the difference between heat and temperature.

Heat: is the flow of thermal energy

Temp: measurement of the average kinetic energy due to random motion.

3. What is specific heat?

Amount of heat required to raise the temp. of 1 kg of a substance 1°C

4. What is the equation for determining the energy of a system?

$$E = m C \Delta T$$

Energy = mass • specific heat • change in temp.

5. What is an isotope? Give an example.

Atoms of the same element with different #'s of neutrons

Ex: Carbon-14

6. A common isotope of iron has a mass number of 56. What is the total number of subatomic particles in the nucleus? How many neutrons does this isotope have?

56 particles in nucleus ; $56 - 26 = 30$ neutrons

7. Describe the three subatomic particles of an atom.

Proton: positive charge; located in nucleus; about 2000x larger than an electron

Neutron: no charge; located in nucleus; same size as proton

Electron: negative charge; located outside nucleus in e^- cloud. Very small - 2000x smaller than a proton.

8. What does the atomic number stand for?

of protons

9. How many neutrons does a carbon atom with a mass number of 14 and an atomic number of 6 have?

$14 - 6 = 8$ neutrons

10. What is a way of organizing the elements based on their chemical properties?

In groups of elements with similar properties and by mass.

11. What do the vertical columns on the periodic table represent?

Groups or families

Elements with similar properties.

12. In what groups are the transition metals located on the periodic table?

Group 3-12

13. What are periods? Why are they arranged this way?

Horizontal rows

In order of increasing atomic #.

14. What three metals are in the third period of the periodic table?

Sodium (Na), magnesium (Mg), and Aluminum (Al)

15. What types of elements are good conductors of heat and electricity?

metals

16. What is a metalloid?

An element with properties of both metals and non-metals. Located along staircase.

17. What group on the periodic table is the least reactive?

Group 18; The noble gases

18. Why don't noble gases such as helium and Xenon form chemical bonds with other elements? Because they have full outer energy levels.

19. How many electrons can fit in the first energy level?

2

20. How many electrons can fit in the second energy level?

8

21. Why do atoms form chemical bonds with other atoms?

In order to become stable or have full outer energy levels.

22. What are the electrons in the outermost energy level called?

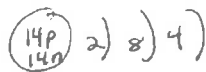
Valence electrons

23. Draw energy level diagrams for elements 3, 14, and 19.

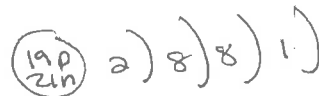
Lithium
3p⁺ 4n 3e⁻



Silicon
14p⁺ 14n 14e⁻



Potassium
19p⁺ 21n 19e⁻



24. How many valence electrons are in an atom of aluminum have?

3

25. What is the device called that allows us to see the atomic spectrum of individual atoms?

What is special about the spectrum of atoms?

Spectrometer

Each atom (type of atom) has a unique atomic spectrum.

26. What are atoms called when they lose or gain electrons?

Ions

27. How does an atom acquire a 1+ charge? How about a 2- charge?

loses one e⁻

gains 2 e⁻

28. Why is life on Earth referred to as carbon-based?

Because carbon is essential to living things

29. What state of matter are most elements in at room temperature?

Solids

Match the following scientist correctly with the statement that applies to them.

Discovered the electron using a cathode ray tube;
Proposed the plum pudding model of the atom

Ernest Rutherford

Proposed the idea that atoms consist of a dense nucleus
surrounded by mostly empty space

Neils Bohr

Proposed a planetary model for the atom where the
nucleus is surrounded by electrons in certain energy
levels that orbit the nucleus.

Werner Heisenberg

Proposed that both the position and energy of an electron
cannot be determined at the same time

J.J. Thomson

Essay prompt:

What is the difference between mass # and
atomic mass?