

Chapter 2: The Chemical Context of Life

Quiz 2

1. Which of the following is a trace element? (Concept 2.1)

- a) hydrogen
- b) copper**
- c) oxygen
- d) nitrogen
- e) carbon

2. Which one of the following is **not** one of the four most abundant elements found in living systems? (Concept 2.1)

- a) hydrogen
- b) nitrogen
- c) carbon
- d) zinc**
- e) oxygen

3. Which one of the following has negligible mass? (Concept 2.2)

- a) proton
- b) neutron
- c) electron**
- d) atom
- e) element

4. The number of protons in an uncharged atom _____. (Concept 2.2)

- a) equals the number of electrons**
- b) equals the number of neutrons
- c) varies with the different isotopes
- d) equals the number of electrons in the outer orbital of the atom
- e) determines its mass number

5. An element has 8 protons, 9 neutrons, and 8 electrons. Its atomic number and atomic mass, respectively, are _____. (Concept 2.2)

- a) 8 and 16
- b) 8 and 17**
- c) 9 and 16
- d) 9 and 17
- e) 16 and 8

6. Two atoms of the same element must have the same number of _____. (Concept 2.2)

- a) neutrons
- b) protons**
- c) electrons
- d) neutrons plus protons
- e) protons plus electrons

7. An uncharged atom of nitrogen (atomic number = 7) has _____. (Concept 2.2)

- a) 7 neutrons
- b) 7 protons and 7 neutrons
- c) 7 neutrons and 7 electrons
- d) 7 protons and 7 electrons**
- e) 7 valence electrons

8. Isotopes of an element will always differ in _____. (Concept 2.2)

- a) atomic number
- b) atomic mass**
- c) number of electrons
- d) number of protons
- e) none of the above

9. A particular carbon isotope has an atomic number of 6 and an atomic mass of 14. The respective number of neutrons, protons, and electrons that this carbon isotope has is _____. (Concept 2.2)

- a) 6, 8, and 6
- b) 6, 6, and 8
- c) 8, 6, and 6**
- d) 8, 6, and 8
- e) 8, 6, and 4


10. Phosphorus-32 (radioactive) has _____ than phosphorus-35 (normal). (Concept 2.2)

- a) 3 more neutrons
- b) 3 more protons
- c) 3 fewer neutrons**
- d) 3 fewer protons
- e) three more atoms


11. Atomic chlorine has an atomic number of 17. It has _____ electrons in its third shell. (Concept 2.2)

- a) 2

- b) 7
- c) 8
- d) 10
- e) 17

12. The chemical characteristics or reactivity of an element depend mostly on the _____. (Concept 2.2 )


- a) number of electrons in its outermost shell**
- b) number of electron shells present in the atoms
- c) mean energy level of its electrons
- d) degree to which it has more or fewer electrons than protons
- e) number of protons plus the number of neutrons

13. How many electrons would be present in the valence shell of a sulfur atom (atomic number 16, mass number 32)? (Concept 2.2 )


- a) 1 electron
- b) 2 electron
- c) 4 electron
- d) 6 electron**
- e) 8 electron

14. A polar covalent bond is a bond that _____. (Concept 2.3 )

- a) is found only in H₂O
- b) is found only in molecules containing oxygen
- c) shares electrons equally between atoms
- d) ionizes
- e) has shared electrons pulled closer to the more electronegative atom**

15. When the proton number and electron number are unequal, the atom or molecule _____. (Concept 2.3 )

- a) forms a covalent bond with another atom
- b) is an ion**
- c) becomes part of a molecule
- d) gains or loses a proton
- e) gains or loses a neutron

16. Ionic bonds form as a result of _____. (Concept 2.3 )

- a) attraction between atoms that have opposite charges**
- b) attraction between hydrogen and other atoms that share electrons unequally
- c) sharing of electron pairs between atoms
- d) unequal sharing of electrons between atoms

e) the asymmetric distribution of electrons in constant motion

17. Which is **not** involved in, or is **not** relevant to, hydrogen bonding? (Concept 2.3)

a) attraction of electrons by one atom more than another

b) partial electrical charges

c) attraction between unlike partial charges

d) loss of electrons

e) polar molecules

18. Hydrogen bonds occur when _____. (Concept 2.3)

a) a molecule with partial charges contacts a molecule without partial charges

b) a molecule with a low molecular weight is bonded to a molecule with a high molecular weight

c) two atoms achieve stable electron configurations by sharing electrons with each other

d) partial opposite charges on molecules come close enough to attract each other

e) none of the above

19. Which of the following statements is **not** true about chemical reactions? (Concept 2.4)

a) They represent the way matter is created and destroyed.

b) They convert reactants to products.

c) They always have the same number of a given atom on each side of the equation arrow.

d) They involve the making and breaking of chemical bonds.

e) They can involve organic as well as inorganic molecules.