

Physical Science
Mid-Year Review Packet
Chemistry

Answers

- 1) Give the number of electrons, protons and neutrons for these elements:
a) fluorine b) sulfur c) arsenic d) strontium e) mercury
9, 9, 10 16, 16, 16 33, 33, 42 38, 38, 50 80, 80, 121
- 2) If the sum of the number of protons and the number of neutrons determines the atomic mass of an element, then why aren't the atomic masses recorded as whole numbers?
Different isotopes have different numbers of neutrons, and the atomic mass represents an "average" atom
- 3) Give the mass of an atom with...
a) 49 protons, 49 electrons and 64 neutrons **113**
b) 31 protons, 31 electrons and 38 neutrons **69**
c) 91 protons, 91 electrons and 140 neutrons **231**
- 4) Determine the number of neutrons in each of the following:
a) a nitrogen atom of mass number 13 **6**
b) a potassium atom of mass number 41 **22**
c) a lead atom of mass number 207 **125**
- 5) Where in the atom are these particles located?
a) protons b) electrons c) neutrons
nucleus orbitals around nucleus nucleus
- 6) Arrange the following in order of increasing mass:
a) 2 Na atoms b) 3 Mg atoms c) a K atom
c, a, b
- 7) The flame test can be used to confirm the presence of an element in a substance. How is this possible?
Atomic spectra (colors) for each element are unique
- 8) What massless particle is responsible for the light that is emitted from an object?
photon
- 9) What is meant by the word periodic in terms of the periodic table?
Characteristics of elements repeat themselves in columns of the table
- 10) What similarity do the atoms in a group share?
Same number of electrons in their outer energy level
- 11) Which of the following elements have fairly similar properties: Ne, Sr, Kr, Br, Rb, Ca, He, Cl, F, Li, and K?
Ne, Kr, He F, Cl, Br Li, K, Rb Ca, Sr

12) The atomic number of gold is 79 and the mass number of one of its isotopes is 197. The number of neutrons is?

- a) 79 b) 197 **c) 118** d) 158

13) Elements in the same group in the periodic table

- a) have similar chemical properties** b) are called isotopes
c) have consecutive atomic numbers d) make up a period of elements

13) All of the following are located in the nucleus of atoms, except

- a) protons **b) electrons** c) neutrons

14) An element has eight protons and seven neutrons. The element is

- a) Phosphorus b) nitrogen **c) oxygen** d) chlorine

15) The atomic weight of potassium has a mass of 39.1 amu. We can conclude that

- a) an atom of potassium has a mass of 39.1 g
b) potassium is a mixture of different masses, the average of which is 39.1 amu
c) every atom of potassium has a mass of 39.1 amu

16) Experimental evidence to support that electrons are located in various energy levels is based on

- a) Rutherford's "gold foil" experiment b) Millikan's "oil drop" experiment
c) Thompson's "plum pudding" model **d) Bohr's idea of atomic spectra**

17) What is the relation between the octet rule and a noble gas structure?

Octet rule says atoms are most stable with 8 electrons in outer energy level; the noble gases have this configuration and are indeed very stable

18) Why is having a noble gas electron configuration so desirable?

It represents a lower state of energy than having a few more or less electrons

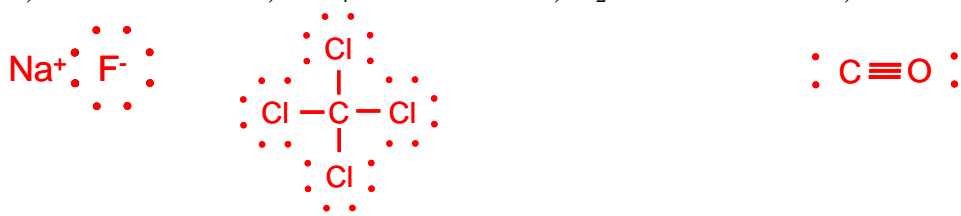
19) Draw Lewis dot diagrams for the following atoms:

- a) N b) Na c) Cl d) Ne e) Br



20) Write a Lewis structure for each of the following:

- a) NaF b) CCl₄ c) N₂ d) CO



21) Why did the chemical activity of the noble gases go undiscovered for so long?

They are not reactive under normal conditions

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23) Write the Lewis structure for O₂. What type of bond has to be formed between the two oxygen atoms to satisfy the octet rule?



24) Give the number of valence electrons for each of the following:

a) S b) C c) Mg d) Ne e) B
6 4 2 8 3

25) Does the Ca²⁺ ion possess a noble gas configuration? Explain.

Yes – it has lost 2 electrons in its 4th energy level, so its electron configuration now looks like Argon

26) What are the charges on the ions in Al₂S₃?

Al⁺³ S⁻²

27) Why do the halogens (fluorine, chlorine, bromine and iodine) occur as diatomic molecules?

They have 7 valence electrons and can become stable by forming a single covalent bond between them

28) Predict whether the bonds formed between the following pairs of elements would be ionic or covalent:

a) Ba, O b) Al, S c) N, Cl d) C, S e) Si, C
I I C C C

29) In the Lewis structure for fluorine, the number of dots surrounding the symbol for fluorine is

a) one b) four c) five d) seven

30) The kind of bonding in sodium chloride is

a) ionic b) covalent c) metallic

31) When K and O react to form the ionic compound K₂O,

a) each potassium atom loses one electron b) each potassium atom loses two electrons
c) each oxygen atom loses one electron d) each oxygen atom loses two electrons

32) A covalent bond is formed

a) when electrons are transferred
b) when electrons are shared
c) when a cation and anion come together
d) only when shared electrons come from the same atom

33) What is the difference between an atom and an ion?

When an atom loses or gains an electron it is called an ion

- 34) Give the symbol and oxidation number for each of the following ions:
 a) fluorine ion b) sodium c) lithium d) beryllium e) carbon
 F^- -1 Na^+ , +1 Li^+ , +1 Be^{2+} , +2 no ion formed!
- 35) Write the formulas for each of the following ionic compounds:
 a) calcium oxide b) potassium oxide c) zinc(I) chloride
 CaO K_2O $ZnCl$
 d) aluminum sulfide e) sodium phosphide
 Al_2S_3 Na_3P
- 36) The elements that are least likely to react with other elements are:
 a) metals b) noble gases c) nonmetals d) metalloids
- 37) The oxidation number of Fe in Fe_2S_3 is
 a) 1^+ b) 2^+ c) 3^+ d) 4^+
- 38) The number of electrons in the outer energy level of Group 17 is
 a) 1 b) 17 c) 2 d) 7
- 39) An atom that has gained an electron is an
a) negative ion b) positive ion c) polar molecule d) nonpolar molecule
- 40) The _____ make up the most reactive group of all metals.
 a) magnetic trio b) coinage metals c) alkali metals d) alkaline earth metals
- 41) The most reactive of all nonmetals is
a) fluorine b) uranium c) hydrogen d) oxygen
- 42) Which of the following is not an element?
a) water b) carbon c) oxygen d) hydrogen
- 43) _____ is an element that would have similar properties to those of neon.
 a) aluminum b) argon c) arsenic d) silver
- 44) The halogens are those elements found in group
 a) 1 b) 11 c) 15 d) 17
- 45) Boron is a
 a) metal b) metalloid c) noble gas d) halogen
- 46) If a pattern repeats itself, it is _____
 a) Isotopic b) metallic c) periodic d) transitional