
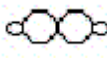


Advanced Chemistry Chapter 2 Test Review

Multiple Choice

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

- _____ 1. Consider the following two compounds: H_2O  and H_2O_2 . According to the law of multiple proportions, the ratio of hydrogen atoms per gram of oxygen in H_2O to hydrogen atoms per gram of oxygen in H_2O_2 is
A) 1:1
B) 2:1
C) 1:2
D) 2:2
E) 4:1
- _____ 2. Which one of the following statements about atomic structure is false?
A) An atom is mostly empty space.
B) Almost all of the mass of the atom is concentrated in the nucleus.
C) The protons and neutrons in the nucleus are very tightly packed.
D) The number of protons and neutrons is always the same in the neutral atom.
E) All of the above statements (A-D) are true.
- _____ 3. Bromine exists naturally as a mixture of bromine-79 and bromine-81 isotopes. An atom of bromine-79 contains
A) 35 protons, 44 neutrons, 35 electrons
B) 34 protons and 35 electrons, only
C) 44 protons, 44 electrons, and 35 neutrons
D) 35 protons, 79 neutrons, and 35 electrons
E) 79 protons, 79 electrons, and 35 neutrons
- _____ 4. Which of the following atomic symbols is incorrect?
A) ${}^{14}_6\text{C}$
B) ${}^{37}_{17}\text{Cl}$
C) ${}^{32}_{15}\text{P}$
D) ${}^{39}_{19}\text{K}$
E) ${}^{14}_8\text{N}$
- _____ 5. The element rhenium (Re) exists as two stable isotopes and 18 unstable isotopes. Rhenium-185 has in its nucleus
A) 75 protons, 75 neutrons
B) 75 protons, 130 neutrons
C) 130 protons, 75 neutrons
D) 75 protons, 110 neutrons
E) not enough information
- _____ 6. Which among the following represent a set of isotopes? Atomic nuclei containing:

- I. 20 protons and 20 neutrons
- II. 21 protons and 19 neutrons
- III. 22 neutrons and 18 protons
- IV. 20 protons and 22 neutrons
- V. 21 protons and 20 neutrons

- A) I, II, III
- B) III, IV
- C) I, V
- D) I, IV and II, V
- E) No isotopes are indicated.

- _____ 7. By knowing the number of protons a neutral atom has, you should be able to determine
- A) the number of neutrons in the neutral atom
 - B) the number of electrons in the neutral atom
 - C) the name of the atom
 - D) two of the above
 - E) none of the above

- _____ 8. Which of the following statements are *true* of uranium-238?

- I. Its chemical properties will be exactly like those of uranium-235.
- II. Its mass will be slightly different from that of an atom of uranium-235.
- III. It will contain a different number of protons than an atom of uranium-235.
- IV. It is more plentiful in nature than uranium-235.

- A) III, IV
- B) I, II, III
- C) I, II, IV
- D) II, III, IV
- E) all of these

- _____ 9. ${}^{40}_{20}\text{Ca}^{2+}$ has
- A) 20 protons, 20 neutrons, and 18 electrons
 - B) 22 protons, 20 neutrons, and 20 electrons
 - C) 20 protons, 22 neutrons, and 18 electrons
 - D) 22 protons, 18 neutrons, and 18 electrons
 - E) 20 protons, 20 neutrons, and 22 electrons

- _____ 10. Which of the following statements is (are) true?
- A) ${}^{18}_8\text{O}$ and ${}^{19}_9\text{F}$ have the same number of neutrons.
 - B) ${}^{14}_6\text{C}$ and ${}^{14}_7\text{N}$ are isotopes of each other because their mass numbers are the same.
 - C) ${}^{18}_8\text{O}^{2-}$ has the same number of electrons as ${}^{20}_{10}\text{Ne}$.

- D) A and B
- E) A and C

- _____ 11. A species with 12 protons and 10 electrons is
- A) Ne^{2+}
 - B) Ti^{2+}
 - C) Mg^{2+}
 - D) Mg
 - E) Ne^{2-}
- _____ 12. The numbers of protons, neutrons, and electrons in ${}^{39}_{19}\text{K}^+$ are:
- A) 20 p, 19 n, 19 e
 - B) 20 p, 19 n, 20 e
 - C) 19 p, 20 n, 20 e
 - D) 19 p, 20 n, 19 e
 - E) 19 p, 20 n, 18 e
- _____ 13. An ion is formed
- A) By either adding or subtracting protons from the atom.
 - B) By either adding or subtracting electrons from the atom
 - C) By either adding or subtracting neutrons from the atom.
 - D) All of the above are true.
 - E) Two of the above are true.
- _____ 14. The formula of water, H_2O , suggests:
- A) There is twice as much mass of hydrogen as oxygen in each molecule.
 - B) There are two hydrogen atoms and one oxygen atom per water molecule.
 - C) There is twice as much mass of oxygen as hydrogen in each molecule.
 - D) There are two oxygen atoms and one hydrogen atom per water molecule.
 - E) None of these.
- _____ 15. All of the following are true *except*:
- A) Ions are formed by adding electrons to a neutral atom.
 - B) Ions are formed by changing the number of protons in an atom's nucleus.
 - C) Ions are formed by removing electrons from a neutral atom.
 - D) An ion has a positive or negative charge.
 - E) Metals tend to form positive ions.
- _____ 16. Which of the following are incorrectly paired?
- A) K, alkali metal
 - B) Ba, alkaline earth metal
 - C) O, halogen
 - D) Ne, noble gas
 - E) Ni, transition metal
- _____ 17. Which of the following are *incorrectly* paired?
- A) Phosphorus, Pr
 - B) Palladium, Pd

- C) Platinum, Pt
- D) Lead, Pb
- E) Potassium, K

- ___ 18. Which of the following are *incorrectly* paired?
- A) Copper, Cu
 - B) Carbon, C
 - C) Cobalt, Co
 - D) Calcium, Ca
 - E) Cesium, Ce
- ___ 19. Which of the following are *incorrectly* paired?
- A) Antimony, Sb
 - B) Silicon, Si
 - C) Silver, Ag
 - D) Argon, Ar
 - E) Astatine, As
- ___ 20. All of the following are characteristics of metals *except*:
- A) good conductors of heat
 - B) malleable
 - C) ductile
 - D) tend to gain electrons in chemical reactions
- ___ 21. All of the following are characteristics of nonmetals *except*:
- A) poor conductors of electricity
 - B) often bond to each other by forming covalent bonds
 - C) tend to form negative ions in chemical reactions with metals
 - D) appear in the upper left-hand corner of the periodic table
- ___ 22. Which of the following has 61 neutrons, 47 protons, and 46 electrons?
- A) ${}_{61}^{80}\text{Pm}$
 - B) ${}_{47}^{108}\text{Ag}^+$
 - C) ${}_{46}^{108}\text{Pd}^-$
 - D) ${}_{47}^{108}\text{Cd}^+$
 - E) ${}_{47}^{108}\text{Ag}$
- ___ 23. Which of the following names is incorrect?
- A) cobalt(II) chloride
 - B) magnesium oxide
 - C) aluminum(III) oxide
 - D) diphosphorus pentoxide
- ___ 24. Which of the following pairs is incorrect?

- A) iodine trichloride, ICl_3
- B) phosphorus pentoxide, P_2O_5
- C) ammonia, NH_3
- D) sulfur hexafluoride, SF_6

- _____ 25. The correct name for LiCl is
- A) lithium monochloride
 - B) lithium(I) chloride
 - C) monolithium monochloride
 - D) lithium chloride
- _____ 26. How many oxygen atoms are there in one formula unit of $\text{Ca}_3(\text{PO}_4)_2$?
- A) 2
 - B) 4
 - C) 6
 - D) 8
 - E) none of these
- _____ 27. The correct name for FeO is
- A) iron oxide
 - B) iron(II) oxide
 - C) iron(III) oxide
 - D) iron monoxide
- _____ 28. The correct name for Ca^{2+} is
- A) calcium
 - B) calcium(II) ion
 - C) calcium ion
 - D) calcium(I) ion
 - E) monocalcium ion
- _____ 29. The formula for calcium bisulfate is
- A) $\text{Ca}(\text{SO}_4)_2$
 - B) CaS_2
 - C) $\text{Ca}(\text{HSO}_4)_2$
 - D) Ca_2HSO_4
 - E) Ca_2S
- _____ 30. Which of the following is *incorrectly* named?
- A) $\text{Pb}(\text{NO}_3)_2$, lead(II) nitrate
 - B) NH_4ClO_4 , ammonium perchlorate
 - C) PO_4^{3-} , phosphate ion
 - D) $\text{Mg}(\text{OH})_2$, magnesium hydroxide
 - E) NO^{3-} , nitrite ion
- _____ 31. All of the following are in aqueous solution. Which is *incorrectly* named?
- A) H_2SO_4 , sulfuric acid
 - B) H_2CO_3 , carbonic acid
 - C) H_3PO_4 , phosphoric acid

- D) HCN, cyanic acid
- E) HCl, hydrochloric acid

_____ 32. All of the following are in aqueous solution. Which is *incorrectly* named?

- A) HC₂H₃O₂, acetic acid
- B) HBr, bromic acid
- C) H₂SO₃, sulfurous acid
- D) HNO₂, nitrous acid
- E) HClO₃, chloric acid

_____ 33. Which of the following pairs is *incorrect*?

- A) NH₄Br, ammonium bromide
- B) K₂CO₃, potassium carbonate
- C) BaPO₄, barium phosphate
- D) CuCl, copper(I) chloride
- E) MnO₂, manganese(IV) oxide

_____ 34. Which of the following name(s) is(are) correct?

1. sulfide, S²⁻
2. ammonium chloride, NH₄Cl
3. acetic acid, HC₂H₃O₂
4. barium oxide, BaO

- A) all
- B) none
- C) 1, 2
- D) 3, 4
- E) 1, 3, 4

_____ 35. Which metals form cations with varying positive charges?

- A) transition metals
- B) Group 1 metals
- C) Group 2 metals
- D) Group 3 metals
- E) metalloids

_____ 36. Which of the following elements does NOT have a symbol taken from a LATIN name for the element or one of its compounds?

- A) iron
- B) copper
- C) sodium
- D) potassium
- E) titanium

_____ 37. Which of the following statements is FALSE?

- A) sulfur does not conduct electricity
- B) gold is malleable
- C) germanium is a metal
- D) silicon is a metalloid

_____ 38. Which of the following ions is NOT likely to form from the appropriate atom?

- A) C⁴⁺
- B) As³⁻
- C) Ti⁴⁺
- D) Ti⁴⁺
- E) Na⁺

C) Mg^{2+}

- _____ 39. How many protons, neutrons and electrons, in that order are present in the anion formed by one atom of ^{125}I ?
A) 53, 74, 54
B) 52, 72, 53
C) 54, 72, 53
D) 53, 72, 54
E) 54, 74, 54
- _____ 40. How many protons, neutrons and electrons, in that order are present in the anion formed by one atom of ^{79}Se ?
A) 34, 34, 45
B) 34, 45, 34
C) 32, 45, 34
D) 34, 45, 36
E) 36, 45, 36
- _____ 41. Which statement is INCORRECT?
A) An atom of ^{60}Zn has an equal number of protons and neutrons
B) An atom of ^{50}Mn has an equal number of electrons and neutrons
C) An atom of ^{18}O has an equal number of protons and neutrons
D) An atom of ^{41}K has an equal number of protons and electrons
E) An atom of ^{238}U contains 146 neutrons.
- _____ 42. Which of the following atoms, isotopes or ions contains 23 protons, 18 electrons and 27 neutrons?
A) $^{45}\text{Co}^{5+}$
B) ^{50}Kr
C) $^{50}\text{V}^{5+}$
D) $^{41}\text{Kr}^{5-}$
E) $^{50}\text{V}^{5-}$
- _____ 43. Which of the following compounds is incorrectly named?
A) $\text{Mg}(\text{OH})_2$ is magnesium dihydroxide
B) CaO is calcium oxide
C) NH_4NO_3 is ammonium nitrate
D) K_3PO_4 is potassium phosphate
E) MgSO_3 is magnesium sulfite

True/False

Indicate whether the statement is true or false.

- _____ 1. The number of neutrons in an atom is the same for all neutral atoms of that element.
- _____ 2. The number of electrons in an atom is the same for all neutral atoms of that element.

Short Answer

1. Complete the following table.

Symbol	# Protons	# Neutrons	# Electrons	Net Charge
^{206}Pb				
	31	38		$3+$

3. Arsenopyrite is a mineral containing As, Fe, and S. Classify each element as metal, nonmetal, or metalloid.

4. Write the symbol for each of the following elements.

- a) silver _____
b) calcium _____
c) iodine _____
d) copper _____
e) phosphorus _____

5. Write the names of the following compounds:

- a) FeSO_4 _____
b) $\text{NaC}_2\text{H}_3\text{O}_2$ _____
c) KNO_2 _____
d) $\text{Ca}(\text{OH})_2$ _____
e) NiCO_3 _____

6. Write the chemical formulas for the following compounds or ions.

- a) nitrate ion _____
b) aluminum oxide _____
c) ammonium ion _____
d) perchloric acid _____
e) copper(II) bromide _____

7. How many atoms (total) are there in one formula unit of $\text{Ca}_3(\text{PO}_4)_2$?

Name the following compounds:

8. $\text{Al}_2(\text{SO}_4)_3$

9. NH_4NO_3

10. NaH

11. $\text{K}_2\text{Cr}_2\text{O}_7$

12. CCl_4

13. AgCl

14. CaSO_4

15. HNO_2

16. N_2O_3

17. SnI_2

Write the formula for:

18. sodium thiosulfate

19. iron(III) oxide

20. dichlorine heptoxide

21. cobalt(II) chloride

22. aluminum hydroxide

23. sulfurous acid

24. nitric acid

25. phosphoric acid

26. acetic acid

27. phosphorus trichloride
