South Pasadena • AP Chemistry

Name Key

Period ____ Date ___/___/___

3•Molecules and Compounds

PRACTICE TEST

1. What is the formula of the ionic compound formed between Mg and Br? Mg^{2+} Br^-
   a) MgBr
   b) Mg_2Br
   c) $MgBr_2$
   d) Mg_2Br_2
   e) Mg_2Br_3

2. What is the formula of the ionic compound formed between Ca and P? Ca^{2+} P^{3-} because of its position on the per. table
   a) Ca_2P_3
   b) CaP
   c) Ca_5P_{10}
   d) Ca_2P
   e) Ca_3P_2

3. What is the name of the SO_3^{2-} ion? memorize
   a) sulfate
   b) nitrate
   c) sulfite
   d) sulfur trioxide
   e) hydrogen sulfate

4. What is the correct formula and charge for the chromate ion? memorize
   a) CrO_4^{2-}
   b) CrO_4^-
   c) $Cr_2O_7^{2-}$
   d) $Cr_2O_7^-$
   e) Cr^{3+}

5. Which one of the following elements forms ions with two different valences?
   a) calcium
   b) arsenic
   c) iron Fe^{2+} Fe^{3+}
   d) fluorine

6. The correct name for CCl_4 is binary nonmetal compound
   a) carbon(I) chloride
   b) carbon chloride
   c) carbon tetrachloride
   d) monocarbon chloride(IV)
   e) carbochlorinate

7. The correct formula for hydrogen telluride is H^+ Te^{2-}
   a) HTe
   b) H_2Te
   c) H_3Te
   d) HTe_2
   from position on table

8. The correct formula for dinitrogen tetroxide is N_2 O_4
   a) NO_2
   b) N_2O_4
   c) N_2O_5
   d) NO_3^-
   e) $(N_2O)_4$

9. The correct name for S_2Cl_2 is
   a) sulfur dichloride
   b) sulfur(I) chloride
   c) sulfur(II) chloride
   d) disulfur dichloride
   e) sulfur chloride
   binary nonmetal compound

10. The correct name for the acid H_3P, is
    a) hydrogen phosphide
    b) trihydrogen phosphide
    c) hydrogen phosphate
    d) phosphorus trihydride
    e) hydrogen triphosphate

11. The molar mass of $(NH_4)_2S$ is closest to:
    a) 50 g/mol
    b) 82 g/mol
    c) 68 g/mol
    d) 100 g/mol
    think N_2H_8S $2(14) + 8(1) + 32 \approx 68$

12. How many atoms are in 12 molecules of glucose, $C_6H_{12}O_6$? $C_6H_{12}O_6$ = 24 atoms
    a) 24
    b) 288
    c) 2160
    d) 7.22×10^{24}
    12 molecules $\times \frac{24 \text{ atoms}}{1 \text{ molecule}} =$

13. Calculate the number of atoms in 4.0×10^{-5} g of aluminum.

a) 8.9×10^{17} c) 6.5×10^{20}

b) 4.6×10^{19} d) 3.8×10^{23}

$4.0 \times 10^{-5}\ g\ Al \times \frac{1\ mol\ Al}{27\ g\ Al} \times \frac{6.02 \times 10^{23}\ atoms}{1\ mol\ Al}$

14. Which of the following samples contains the smallest number of atoms?

a) 1 g H_2 2 g/mol c) 1 g O_3 48 g/mol

b) 1 g O_2 32 g/mol d) 1 g Cl_2 71 g/mol

DIVIDE BY LARGEST MOLAR MASS

15. What is the mass of **one molecule** of octane, C_8H_{18}? 1 molecule $8(12) + 18 = 114$

a) 114 g c) 1.10×10^{-22} g

b) 1.89×10^{-22} g d) 4.32×10^{-23} g

$1\ molec \times \frac{1\ mole}{6.02 \times 10^{23}\ molec} \times \frac{114\ g}{1\ mole} =$

16. What is the percent nitrogen (by mass) in ammonium carbonate, $(NH_4)_2CO_3$?

a) 14.53% c) 29.16%

b) 27.83% d) 33.34%

THINK $N_2H_8CO_3$

$\frac{28}{96} \times 100 =$

17. Of the following, the only empirical formula is

a) N_2F_2 c) H_2C_2

b) N_2F_4 d) HNF_2

18. A compound consists of the following elements by weight percent: assume 100 g

carbon - 40.0% $\times \frac{1\ mole}{12\ g} = 3.33$

oxygen - 53.3% $\times \frac{1\ mole}{16\ g} = 3.33$

hydrogen - 6.7% $\times \frac{1\ mole}{1\ g} = 6.7$

The ratio of carbon : oxygen : hydrogen in the empirical formula is

a) 1:2:1 c) 1:1:2

b) 1:1:1 d) 2:1:2

(NOTE: empirical formula = CH_2O)

19. An organic compound which has the empirical formula CHO has a molar mass of 232. Its molecular formula is:

a) CHO c) $C_4H_4O_4$

b) $C_2H_2O_2$ d) $C_8H_8O_8$

$C + H + O = 12 + 1 + 16 = 29$

$232 / 29 = 8$

20. When $CaSO_4 \cdot y\ H_2O$ is heated, all of the water is driven off. If 34.0 g of $CaSO_4$ [molar mass = 136] is formed from 43.0 g of $CaSO_4 \cdot y\ H_2O$, what is the value of y?

a) 1 c) 3

b) 2 d) 4

$34\ g\ CaSO_4 \times \frac{1\ mole}{136\ g} = \frac{.25\ mol}{.25}$ (1)

$43 - 34 = 9$

$9\ g\ H_2O \times \frac{1\ mol}{18\ g} = \frac{.50\ mol}{.25}$ (2)

Answers:

1. c	6. c	11. c	16. c
2. e	7. b	12. b	17. d
3. c	8. b	13. a	18. c
4. a	9. d	14. d	19. d
5. c	10. a	15. b	20. b