

Chem 110, Exam. (1)

Time : 2 hours

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| Name: | Useful information |
| Number: |  |
| Section: |  |

With the best wishes

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| **Directions:** For each of the following questions, choose the letter that **best** answers the question and place it on your answer sheet. |

1. Which experiment led to the belief that the atom contained an extremely small, positively charged nucleus?
   1. Millikan's oil drop experiment
   2. Rutherford's scattering experiment\*
   3. Thomson's cathode ray tube experiment
   4. Moseley's experiment on X-ray emission by metals
2. How many neutrons are present in an atom of silver which has a mass number of 108?
3. 14
4. 47
5. 61\*
6. 108
7. If 8.6 x 1023 molecules of calcium hydroxide are present, what will be its weight in gram ?
8. 25.8 grams
9. 74.2 grams
10. 51.6 grams
11. 105.9 grams\*
    1. Which of the following expressions represents two molecules of water?
       1. H2O
       2. H2O2
       3. 2 H2O\*
       4. 2 HO2
12. Which formula is **not** correct? 
    1. A12(SO4)3
    2. BaHCO3\*
    3. Ca(OH)2
    4. NH4HSO4
13. The number of atoms in the molecule Cr2(SO4)3 is
14. 5
15. 8
16. 15
17. 17\*
18. How many molecules are present in a 6.0 gram sample of carbon dioxide, CO2?
19. 6.0
20. 
21. \*
22. 
23. The empirical formula for thecompoundNa2S2O4
    1. NaSO
    2. NaS2O2
    3. NaSO2\*
    4. Na2S2O2
    5. Determine the formula for chromium(III) hypochlorite;
       1. CrC1O
       2. Cr(ClO)3\*
       3. Cr2(ClO)3
       4. Cr3(ClO)2
24. Which is the correct name for Fe2(SO4)3 ?
25. Iron(II) sulfate
26. Iron(III) sulfate\*
27. Iron(III) sulfide
28. Iron(II) sulfite
29. Copper(I) oxalate has the formula Cu2C2O4. Find the formula for aluminum oxalate.
30. Al3(C2O4)2
31. A1C2O4
32. Al2C2O4
33. Al2(C2O4)3 \*

1. The formula of stannic oxide is SnO2. The valence of Sn is
2. +1
3. +2
4. +3
5. +4\*
6. The correct formula for magnesium(II) phosphate is
7. Mg(PO4)2
8. MgPO4
9. Mg3(PO4)2\*
10. Mg2(PO4)3
11. Assume that you have tow isotopes of the element 5B ; the mass and the naturally occurring of the tow isotopes are as follows (10.0129 amu ,19.78 % ) and (11.0093 amu 80.22%, ) . What is the average value of the atomic weight?

(a) 10.81\*

(b) 1081.22

(c) 108.122

(d) 16.98

1. The mass of mole of the compound Al2X3 is found to be 150.26 . What is the anion X in the compound ?
2. F
3. S\*
4. N
5. O
   1. Morphine, an addictive drug, has the molecular formula C17H19NO3.The number of Oxygen atoms in 25 g of morphine is:
      1. 9.01×1023
      2. 1.59×1023
      3. 0.53×1023
      4. 15.89×1023
      5. Determine the empirical formula of Orlon which is 67.9% C, 5.70% H and 26.4% N by mass .  
         (Atomic weights: C = 12.01, H = 1.008, N = 14.01).
6. C2H3N
7. C3H3N\*
8. CHN
9. CH2N
10. A compound has the empirical formula H1C1  and molecular mass 78.11 g. The molecular formula could be written as
    1. H2C2
    2. H4C4
    3. H5C5
    4. H6C6
    5. The molecular formula of ascorbic acid (vitamin C) is C6H8O2. To three significant figures what is the percentage carbon in vitamin C?  
       (Atomic weights: C = 12.01, O = 16.00, H = 1.008).
11. 64.3\*
12. 34.8
13. 28.5
14. 81.4
15. The number of protons (p) , neutrons (n) and electrons (e) for the cation 
    1. 24 p, 28 n, 24 e
    2. 52 p, 24 n, 52 e
    3. 24 p, 28 n, 21 e\*
    4. 21 p, 24 n, 21 e

* 1. The coefficient X which should appear when the following molecular equation,

C2H6 + X O2 🡪 CO2 + H2O, is correctly balanced is

1. 7 \*
2. 2
3. 8
4. 6
5. What is the name of one of two or more forms of an element ?
   1. Compound .
   2. Allotropes . \*
   3. Elements .
   4. Isotopes .
6. Consider the unbalanced expression**:**

CH3CH2CHO(l) + O2(g) 🡪 CO2 (g) + H2O(g).

Which set of coefficients balances the equation;

1. 2, 8, 3, 6
2. 3, 8, 6, 6
3. 1, 4, 3, 2
4. 1, 4, 3, 3\*
   1. Which statement is false for the balanced equation given below?  
      (Atomic weights: N = 14.01, H = 1.008).

N2 + 3 H2 rx 2 NH3

1. One molecule of nitrogen requires three molecules of hydrogen
2. The reaction of 14 g of nitrogen produces 34 g of NH3\*
3. The reaction of 3 moles of hydrogen will produce 34 g of NH3
4. One mole of N2 will produce two moles of NH3
   1. What is the limiting reagent and what quantity of CaF2 results from the reaction of 3.00 g of calcium and 2.00 g of fluorine?  
      (Atomic weights: Ca = 40.08, F = 19.00).

Ca + F2 rx CaF2

1. Ca, 3.22
2. Ca, 4.11
3. F2, 4.11\*
4. F2, 4.78
5. Reaction of 1.00 mole CH4 with excess Cl2 yields 96.8 g CCl4. What is the percent yield of CCl4 ?  
   (Atomic weights: C = 12.01, Cl = 35.45).

CH4 + 4 Cl2 rx CCl4 + 4 HCl

1. 64.3
2. 57.3
3. 65.9
4. 62.9\*  
   1. What should be done to prepare 500.0 mL of a 0.200 M solution of NaCl?
      1. 11.7 g of NaCl should be dissolved in 500.0 mL of H2O
      2. 11.7 g of NaCl should be dissolved in sufficient H2O to give a total volume of 500.0 mL
      3. 5.84 g of NaCl should be dissolved in sufficient H2O to give a total volume of 500.0 mL\*
      4. 2.92 g of NaCl should be dissolved in 500.0 mL of H2O
5. Determine the number of moles of solute present in 186 mL of 0.1475 *M* H3PO4.

(Atomic weights: P = 30.97, H = 1.008, O = 16.00).

* 1. 0.0156
  2. 0.0311
  3. 0.0182
  4. 0.0274\*

1. What volume, in mL, of a 0.0250 *M* solution is required to provide 0.0245 g of NaCN?  
   (Atomic weights: Na = 22.99, C = 12.01, N = 14.01).
   1. 27.5
   2. 17.5
   3. 20.0\*
   4. 25.0
2. Fluoxymesterone, C20H29FO3, is an anabolic steroid. A solution is prepared by dissolving 0.01 g of the steroid in 500.0 mL of water. If this solution is diluted to a final volume of 1.00 L. What is the resulting molarity?  
   (Atomic weights: C = 12.01, O = 16.00, F = 19.00, H = 1.008).
3. 2.97 x 10-11
4. 2.97 x 10-8
5. 5.94 x 10-8
6. 2.97 x 10-5\*