PRACTICE CHEMISTRY PLACEMENT EXAM

1. How many of the numbers below have 5 significant figures?

   0.0054 19.000 0.00006 1.6090×10^8 13607

   a) 1
   b) 2
   c) 3
   d) 4
   e) 5

2. Nitric acid is a solution of which of the following dissolved in water?

   a) HNO_4
   b) H_2NO_3
   c) HNO_2
   d) HNO_3
   e) H_2NO

3. Which of the following is the smallest mass?

   a) 2.1 kg
   b) 4.2×10^{10} ng
   c) 5.8×10^2 g
   d) 8.4×10^4 cg
   e) 6.7×10^4 mg

4. If 250 mL of a 0.50 M NaCl solution is diluted to 840 mL, what is the molarity of the resulting solution?

   a) 0.15 M
   b) 6.7 M
   c) 0.60 M
   d) 1.7 M
   e) 0.0025 M

5. Iron(III) sulfite has the formula

   a) Fe_3SO_3
   b) $Fe_2(SO_4)_3$
   c) $Fe_2(SO_3)_3$
   d) Fe_2SO_4
   e) Fe_2SO_3

6. How many atoms of carbon are in 24 grams of carbon?

   a) 1.2×10^{24} atoms
   b) 1.7×10^{26} atoms
   c) 1.2×10^{25} atoms
   d) 3.0×10^{24} atoms
   e) 3.0×10^{23} atoms

7. A solution is prepared by dissolving sugar in water. The solution is 25.0%, by mass, sugar. How many grams of **WATER** are in 472 grams of this solution?

   a) 118 g
   b) 157 g
   c) 408 g
   d) 354 g
   e) 396 g

8. The balanced chemical equation for the reaction between PCl_5 and water is given below. If 3.45 moles of HCl are produced, how many moles of water reacted?

$$PCl_5 + 4\ H_2O \rightarrow H_3PO_4 + 5\ HCl$$

   a) 0.690 mol
   b) 0.863 mol
   c) 2.76 mol
   d) 3.45 mol
   e) 4.31 mol

9. How many grams of calcium bromide are in 50.0 mL of a 0.25 M calcium bromide solution?

   a) 2.5 g
   b) 1.5 g
   c) 1.3×10^{-2} g
   d) 24 g
   e) 40. g

10. 26.0 g of a liquid that has a density of 1.44 g/mL needs to be measured out in a graduated cylinder. What volume should be used?

   a) 37.4 mL
   b) 0.0554 mL
   c) 18.1 mL
   d) 0.0267 mL
   e) 26.0 mL

11. One gram of alum, $KAl(SO_4)_2 \cdot 12H_2O$, contains 1.3×10^{21} Al atoms. How many oxygen atoms are contained in 1.0 g alum?

a) 1.3×10^{21} atoms
b) 2.6×10^{22} atoms
c) 1.6×10^{22} atoms
d) 1.0×10^{22} atoms
e) 2.1×10^{22} atoms

12. How many grams of AlF_3 are in 2.64 moles of AlF_3?

a) 3.14×10^{-2} g
b) 121 g
c) 222 g
d) 5.74×10^{-2} g
e) 31.8 g

13. The balanced chemical equation for the reaction between PCl_5 and water is given below. If 12.0 g of PCl_5 reacts completely with water, how many grams of HCl will be produced?

$$PCl_5 + 4\,H_2O \rightarrow H_3PO_4 + 5\,HCl$$

a) 60.0 g
b) 2.10 g
c) 0.420 g
d) 0.0952 g
e) 10.5 g

14. Which of the following would be the correct name for N_2O_3?

a) dinitrogen trioxide
b) nitrogen(II) oxide
c) nitrogen(III) oxide
d) nitrogen oxide
e) nitrogen(II) oxygen(III)

15. How many moles of C_4F_8 are in 265 grams of C_4F_8?

a) 8.55 mol
b) 1.89×10^{-5} mol
c) 5.30×10^{4} mol
d) 1.32 mol
e) 0.755 mol

16. What is the percent, by mass, of oxygen in $Zn(BrO_3)_2$?

a) 24.83%
b) 39.00%
c) 29.89%
d) 39.79%
e) 17.57%

17. Given: $Z = 0.43Y + 12$; What is Y when $Z = 28$?

a) 93
b) 6.9
c) 24
d) 17
e) 37

18. A metal having a mass of 44 grams is dropped in 118.2 cm^3 of water and sinks to the bottom. The volume of the water and object is 124.3 cm^3. What is the density of the metal?

a) 0.37 g/cm^3
b) 7.2 g/cm^3
c) 0.35 g/cm^3
d) 2.7 g/cm^3
e) 2.9 g/cm^3

19. When the equation below is properly balanced, what is the coefficient for S_8?

$$Cr + S_8 \rightarrow Cr_2S_3$$

a) 1
b) 2
c) 3
d) 4
e) none of these

20. An antacid tablet containing 0.50 g of $NaHCO_3$ is dissolved in 250 mL of water. What is the molar concentration of $NaHCO_3$ in the solution?

a) 0.024 M
b) 4.1 M
c) 0.0020 M
d) 0.0060 M
e) 2.0 M

21. What is the formula of the compound formed between the potassium ion and the sulfide ion?

a) KS
b) KS_2
c) K_2S_3
d) KS_3
e) K_2S

22. How many mL of 0.250 M H_2SO_4 is required to completely react with 25.0 mL of 1.50 M NaOH?

$$H_2SO_4 + 2\ NaOH \rightarrow Na_2SO_4 + 2\ H_2O$$

a) 150. mL
b) 50.0 mL
c) 300. mL
d) 75.0 mL
e) none of the above

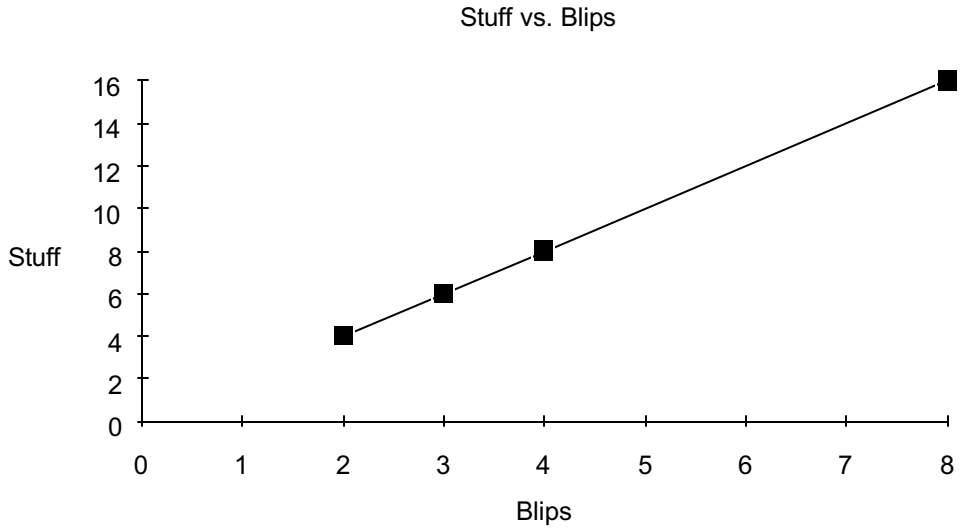
23. Assume that you are a physician administering a drug in a solution containing 5.0 mg drug/L solution. If the recommended dosage of the drug is 3.5×10^{-6} g per kilogram of body weight, what volume of solution would you prescribe daily for a 68 kg patient?

a) 97 mL
b) 53 mL
c) 86 mL
d) 23 mL
e) 48 mL

24. How many kilometers is 5.82×10^4 cm?

a) 5.82×10^3 km
b) 0.582 km
c) 5.82×10^9 km
d) 5.82 km
e) 5.82×10^5 km

25. Data was collected on an experiment that relates "Stuff" to "Blips". Using a "best fit" line for the data, how much stuff would I have if I had 20 blips?



a) 0 b) 10 c) 20 d) 30 e) 40

Answers:

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