

"It's the end of the world as we know it  
And I feel fine." REM

## ***The Last Workshop: Review for the Final***

This workshop is designed to help you review for the final examination. Questions are available on various topics discussed during the course of the semester. In a round-robin fashion, students will select questions that will be answered by the entire group.

### ***Workshop: Review for the Final***

1. Which of the following is classified as a chemical change (A) the evaporation of water, (B) the melting of gold, (C) the souring of milk, (D) both (A) and (B), (E) both (B) and (C).
2. The melting point of a compound is  $176^{\circ}\text{C}$ . What is its value in  $^{\circ}\text{F}$ ?
3. You wish to find the density of a liquid. You measure the mass of a graduated cylinder to be 41.3 g. You then add 25.00 mL of liquid to the graduated cylinder, and the mass of the liquid and graduated cylinder is 65.9 g. What is the density of the liquid in g/mL?
4. In the laboratory, mass units are normally expressed in what unit? \_\_\_\_\_
5. A sprinter runs the 100 m dash in 9.98 s. What is his speed in miles/hour?
6. A straightline graph between two variables that passes through the origin is called \_\_\_\_\_
7. A gas occupies 40 L at  $75^{\circ}\text{C}$ . What is its volume in L at  $150^{\circ}\text{C}$ ?
8. A gas sample is maintained at a constant pressure allowing the volume to vary as the temperature changes. As the temperature of the gas decreases, the volume (A) increases (B) decreases (C) stays the same (D) insufficient information is provided.

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9. Dalton's atomic theory (A) was developed in 1944, (B) suggested that atoms cannot be created or destroyed, (C) suggested electrons were present, (D) both (A) and (B), (E) both (B) and (C).
10. The nuclear symbol for barium-138 is  ${}_{56}^{138}\text{Ba}$ . How many protons are in its nucleus and what is the atomic number of barium?
11. What characteristic do all oxygen atoms have in common? (A) all have 8 protons (B) all have 8 neutrons, (C) all have 8 electrons, (D) all have a mass of 16.00 amu, (E) both (A) and (D).
12. Elements on the left side of the periodic table are called \_\_\_\_\_
13. Three elements that exist as diatomic molecules are (A) Fe, F, Cl; (B) N, O, Ne; (C) Al, B, Ga (D) F, Cl, Br (E) Si, P, S.
14. The charges of monatomic ions of Group 1A elements are \_\_\_\_\_
15. The formula of sodium sulfide is \_\_\_\_\_
16. The name for  $\text{P}_2\text{O}_3$  is \_\_\_\_\_
17. What is the molar mass of  $(\text{NH}_4)_3\text{PO}_4$  in g/mol?
18. You are carrying out a laboratory reaction that requires 0.600 mole of  $\text{BaCl}_2$ . The mass of  $\text{BaCl}_2$  that must be weighed out is \_\_\_\_\_
19. How many carbon dioxide molecules are in 256 g of carbon dioxide
20. One mole of  $\text{Na}_3\text{P}$  contains (A)  $6.02 \times 10^{23}$   $\text{Na}^+$  ions, (B)  $6.02 \times 10^{23}$   $\text{P}^{3-}$  ions, (C) 100.0 g of  $\text{Na}_3\text{P}$ , (D) both (A) and (B), (E) both (B) and (C).
21. Balance the following chemical equation  $\_\_ \text{C}_3\text{H}_8 + \_\_ \text{O}_2 \rightarrow \_\_ \text{CO}_2 + \_\_ \text{H}_2\text{O}$ ,
22. The reaction in problem 22 is an example of what type of reaction? \_\_\_\_\_
23. Neutralization reactions involve the reaction of (A) acids and metals (B) bases and metal ions (C) acids and bases (D) organic compounds and oxygen (E) acids and hydrogen.

24. Given  $\text{PCl}_5 + 4\text{H}_2\text{O} \rightarrow \text{H}_3\text{PO}_4 + 5\text{HCl}$ , calculate the grams of HCl produced by 1 mole of  $\text{H}_2\text{O}$ .
25. For the equation in problem 24, calculate the grams of HCl produced by 10.1 g  $\text{H}_2\text{O}$ .
26. Quantized energy (A) may have any value, (B) is limited to specific values, (C) describes the energy of electrons, (D) both (A) and (B), (E) both (B) and (C).
27. The maximum number of electrons in a p sublevel is \_\_\_\_\_.
28. The electron configuration for  $\text{Na}^+$  is \_\_\_\_\_.
29. The halogens have which number of valence electrons \_\_\_\_\_.
30. Double bonds consist of what number of electrons? \_\_\_\_\_.
31. The electron group geometry of  $\text{H}_2\text{O}$  is \_\_\_\_\_.
32. The molecular geometry of  $\text{H}_2\text{O}$  is \_\_\_\_\_.
33. The electron group angle in  $\text{H}_2\text{O}$  is approximately \_\_\_\_\_.
34. Nonmetals (A) have low ionization energies, (B) gain electrons, (C) form compounds with metals, (D) both (A) and (B), (E) both (B) and (C).
35. How many moles of argon are in a 13.00 L gas cylinder at  $32^\circ\text{C}$  if they exert a pressure of 2.14 atm?
36. Consider the following equation:  $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightarrow 2\text{NH}_3(\text{g})$  Assume that the reactants and products are at  $0^\circ\text{C}$  and 745 torr. How many liters of ammonia are produced from the reaction of 2.4 liters of  $\text{H}_2$  with excess  $\text{N}_2$ ?
37. The weakest intermolecular forces are \_\_\_\_\_.
38. 14.1 g of NaOH are dissolved in 300 mL of water. Calculate the molarity of the solution.

39. How many grams of NaOH are required to prepare 200 mL of 0.5 M NaOH?

40. You titrate 25 mL of HCl solution of unknown concentration with 28.9 mL of 0.300 M NaOH.  
 $\text{NaOH} + \text{HCl} \rightarrow \text{H}_2\text{O} + \text{NaCl}$  What is the molarity of the HCl solution?

41. You add 25.00 mL of 0.5 M HCl to an antacid tablet, and back titrate it with 10 mL of 0.5 M NaOH.  
(Same reaction as problem 40.) How many moles of base are in the antacid?

42. According to the Bronsted-Lowry definition of acids and bases, an acid is defined to be  
\_\_\_\_\_

43. The conjugate acid of  $\text{H}_2\text{PO}_4^-$  is \_\_\_\_\_.

44. If the pH of a solution is 4, the pOH is \_\_\_\_\_.

45. A solution with a pH of 4 is said to be (A) alkaline (B) acidic (C) neutral (D) basic (E) amphoteric.

46. If  $[\text{H}^+] = 1 \times 10^{-5}$ , then the  $[\text{OH}^-] =$  \_\_\_\_\_.

47. Properties of acids include (A) sour taste, (B) reaction with metals to produce hydrogen gas, (C) reaction with metal ions to produce precipitates, (D) both (A) and (B), (E) both (B) and (C).