

# CHEM-118-03 Final Exam

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## Fall 2024

1. The key to success in chemistry is: (1 points)
  - A) curiosity.
  - B) mathematical skills.
  - C) commitment.
  - D) practice.
  - E) all of the above
  
2. If 250.0 grams of ethanol occupies a volume of 316 mL, what is the density of ethanol? (1 points)
  - A) 0.65 g/mL
  - B) 0.79 g/mL
  - C) 0.94 g/mL
  - D) 1.10 g/mL
  - E) 1.25 g/mL
  
3. How many feet are in 275 centimeters? (1 inch = 2.54 cm, 1 foot = 12 inches) (1 points)
  - A) 9.02 feet
  - B) 9.42 feet
  - C) 8.97 feet
  - D) 9.33 feet
  
4. Convert 77 degrees Fahrenheit to degrees Celsius. (1 points)
  - A) 20 °C
  - B) 22 °C
  - C) 25 °C
  - D) 30 °C
  - E) 35 °C

5. What is 500 milligrams in grams? (1 points)

- A) 0.5 g
- B) 5 g
- C) 50 g
- D) 0.05 g
- E) 5000 g

6. Determine the number of significant figures in the number  $6.0200 \times 10^3$ . (1 points)

- A) 2
- B) 3
- C) 4
- D) 5
- E) 6

7. How many significant figures are there in 123,000? (1 points)

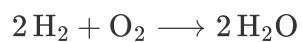
- A) 3
- B) 4
- C) 5
- D) 6
- E) Indeterminate

8. Calculate  $(6.02 \times 10^3) \div (3.00 \times 10^2)$  and express the result with the correct number of significant figures. (1 points)

- A) 20.0667
- B) 20.067
- C) 20.1
- D) 20.06

9. Calculate the sum  $1.258 + 12.3 + 0.01$  with the correct number of significant figures. (1 points)
- A) 13.568
  - B) 13.57
  - C) 13.5
  - D) 13.6
10. If 500 J of heat is added to a 10 g sample of water (specific heat capacity  $c = 4.18 \text{ J/g}^\circ\text{C}$ ), by how many degrees Celsius will the temperature increase? (1 points)
- A)  $5.2^\circ\text{C}$
  - B)  $7.5^\circ\text{C}$
  - C)  $10^\circ\text{C}$
  - D)  $12^\circ\text{C}$
11. What type of change is ice cream melting? (1 points)
- A) Physical change
  - B) Chemical change
  - C) Both physical and chemical changes
  - D) Neither
12. Photosynthesis in plants is an example of: (1 points)
- A) Physical change
  - B) Chemical change
  - C) Physical weathering
  - D) None of the above

13. Given the reaction: (1 points)



If 4.0 grams of  $\text{H}_2$  react completely with 32.0 grams of  $\text{O}_2$ , what is the mass of the water produced?

- A) 16.0 g
- B) 18.0 g
- C) 34.0 g
- D) 36.0 g
- E) 40.0 g

14. An element with atomic number 13, mass number 27, and 10 electrons forms which ion? (1 points)

- A)  $\text{Al}^{3+}$
- B)  $\text{Al}^+$
- C)  $\text{N}^{3-}$
- D)  $\text{Ne}^{3+}$

15. An element has an atomic number of 7, mass number of 14, and 10 electrons. What is the ion's symbol? (1 points)

- A)  $\text{N}^{3-}$
- B)  $\text{N}^{3+}$
- C)  $\text{C}^{3+}$
- D)  $\text{F}^{3-}$

16. Which atomic symbol belongs to an element with 20 protons and 20 neutrons? (1 points)

- A) Ca
- B) Sc
- C) Ti
- D) V

17. An element has 26 protons, 30 neutrons, and 26 electrons. What is the correct isotopic symbol for this element? (1 points)
- A)  $^{56}_{26}\text{Fe}$
  - B)  $^{56}_{26}\text{Mn}$
  - C)  $^{56}_{30}\text{Fe}$
  - D)  $^{52}_{26}\text{Fe}$
  - E)  $^{60}_{26}\text{Fe}$
18. An element has 18 protons, 22 neutrons, and 18 electrons. What is the isotopic symbol? (1 points)
- A)  $^{40}_{18}\text{Ar}$
  - B)  $^{40}_{20}\text{Ca}$
  - C)  $^{40}_{18}\text{K}$
  - D)  $^{40}_{22}\text{Ar}$
  - E)  $^{38}_{18}\text{Ar}$
19. **Chemical Formula:**  $\text{Ca}_3(\text{PO}_4)_2$
- How many atoms of each element are present? (1 points)
- A) Ca: 3, P: 2, O: 8
  - B) Ca: 3, P: 2, O: 6
  - C) Ca: 3, P: 2, O: 4
  - D) Ca: 1, P: 2, O: 8
20. What is the correct name for  $\text{N}_2\text{O}_5$ ? (1 points)
- A) Dinitrogen pentoxide
  - B) Nitrogen dioxide
  - C) Nitrogen pentoxide
  - D) Dinitrogen monoxide
  - E) Nitrogen oxide

21. What is the correct name for  $\text{Ca}(\text{NO}_3)_2$ ? (1 points)

- A) Calcium nitrate
- B) Calcium nitrite
- C) Calcium nitride
- D) Calcium nitrogen dioxide
- E) Calcium dinitrate

22. What is the mass of 1.50 moles of  $\text{CaCO}_3$ ?

- A) 150 grams
- B) 100 grams
- C) 75 grams
- D) 60 grams
- E) 45 grams

23. Find the number of moles in 200.5 g of  $\text{CO}_2$ ?

- A) 4.556 mol
- B) 4.632 mol
- C) 4.800 mol
- D) 5.123 mol
- E) 4.568 mol

24. How many moles are in  $7.89 \times 10^{22}$  molecules of nitrogen gas,  $\text{N}_2$ ?

- A) 0.131 moles
- B) 0.523 moles
- C) 1.31 moles
- D) 7.89 moles
- E) 0.079 moles

25. Calculate the mass percent composition of sulfur in  $\text{Al}_2(\text{SO}_4)_3$ . Use units and proper mathematical notation throughout your calculations. (3 Points)

26. Balance the following chemical equation: (3 Points)

