CHEM-118-03 Final Exam

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 6.0200×10^3. (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 $c = 4.18\,\mathrm{J/g^\circ C}$), by how many degrees Celsius will the temperature increase? (1 points)

A) 5.2°C

B) 7.5°C

C) 10°C

D) 12°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)

$2\,H_2 + O_2 \longrightarrow 2\,H_2O$

If 4.0 grams of H_2 react completely with 32.0 grams of 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) Al^{3+}

B) Al^{+}

C) N^{3-}

D) 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) N^{3-}

B) N^{3+}

C) C^{3+}

D) 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) $^{56}_{26}\mathrm{Fe}$

B) $^{56}_{26}\mathrm{Mn}$

C) $^{56}_{30}\mathrm{Fe}$

D) $^{52}_{26}\mathrm{Fe}$

E) $^{60}_{26}\mathrm{Fe}$

18. An element has 18 protons, 22 neutrons, and 18 electrons. What is the isotopic symbol? (1 points)

A) $^{40}_{18}\mathrm{Ar}$

B) $^{40}_{20}\mathrm{Ca}$

C) $^{40}_{18}\mathrm{K}$

D) $^{40}_{22}\mathrm{Ar}$

E) $^{38}_{18}\mathrm{Ar}$

19. **Chemical Formula:** $\mathrm{Ca_3(PO_4)_2}$

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 $\mathrm{N_2O_5}$? (1 points)

A) Dinitrogen pentoxide

B) Nitrogen dioxide

C) Nitrogen pentoxide

D) Dinitrogen monoxide

E) Nitrogen oxide

21. What is the correct name for $\mathrm{Ca(NO_3)_2}$? (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 $\mathrm{CaCO_3}$?

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 $\mathrm{CO_2}$?

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 7.89×10^{22} molecules of nitrogen gas, $\mathrm{N_2}$?

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 $\mathrm{Al_2(SO_4)_3}$. Use units and proper mathematical notation throughout your calculations. (3 Points)

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

$\mathrm{C_3H_8 + O_2 \longrightarrow CO_2 + H_2O}$

27. What was your favorite part of this course? What was the worst part? What would you do to make it better? (3 points Extra Credit)