

CHM 130 Fall 2016 Exam I Key (Ch. 1-4) 100 pts

Phones must be off and put away. I see a phone = Cheating = 0 on the exam.

Show all your work with units for calculations. Make sure each answer has the proper number of significant figures and units. There is only one best choice for multiple choice questions. Good luck! You got this!

1. Which statement is FALSE about the scientific method? (Circle one) (2 pt)

- a. You only need to do one experiment.
- b. You need to formulate a hypothesis.
- c. You should draw a conclusion.
- d. You should make observations.
- e. You should perform research.

2. Which state of matter has a definite shape and constant volume? (2 pts)

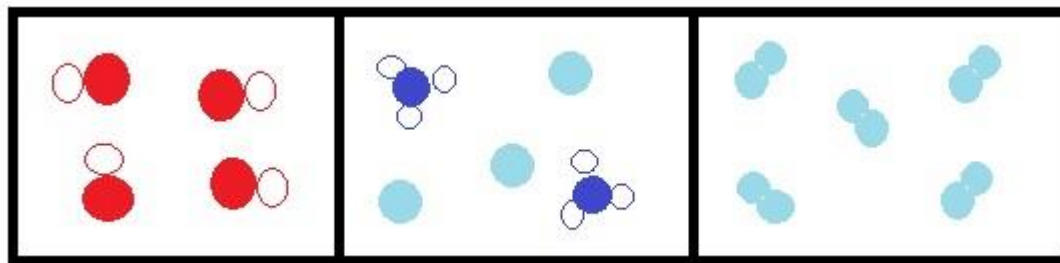
- a. gas
- b. liquid
- c. solid

3. Label each of the following as a chemical property (CP) or physical property (PP). 3 pts (1 pt each)

- a. shiny PP
- b. explosive CP
- c. boiling point of 32°C PP

4. Boron is a metal, nonmetal or semi-metal? 2 pts semi-metal

5. Label each of the following as a mixture, compound or element: 3 pts (1 pt each)



compound

mixture

element

6. Write the symbol for the following elements: 6 pts (2 pts each)

- a. Sodium Na
- b. silicon Si
- c. silver Ag

7. Write the name for the following elements: 6 pts (2 pts each)

- a. N nitrogen
- b. Au gold
- c. Mg magnesium

8. What is the physical state (solid, liquid or gas) of each of the following elements? 3 pts (1 pt each)

- a. Pb solid
- b. Br₂ liquid
- c. Ne gas

9. How many significant figures are in each of the following numbers? 3 pts (1 pt each)

- a. 22,020 4
- b. 0.00300 3
- c. 14.000 5

10. Write these numbers in scientific notation: 4 pts (2 pts each)

a. $0.000000003050 \text{ mL} = \underline{3.050 \times 10^{-9} \text{ mL}}$

b. $23,000,000,000 \text{ } \mu\text{m} = \underline{2.3 \times 10^{10} \text{ } \mu\text{m}}$

11. Perform the following calculations and express the answers with the proper units and significant figures. 9 pts (3 pts each)

a. $935.256 \text{ mg} + 82.6 \text{ mg} = \underline{1017.9 \text{ mg}}$

b. $1.16 \times 10^{74} \text{ m}^2 / 5.24 \times 10^{36} \text{ m} = \underline{2.21 \times 10^{37} \text{ m}}$

c. $2020 \text{ cm} \times 34.92 \text{ cm} = \underline{70,500 \text{ cm}^2 \text{ or } 7.05 \times 10^4 \text{ cm}^2}$

12. How many μL (microliters) are in one L? 2 pts 1,000,000

13. Peyton's super bowl ring is 18 K gold. If the mass of the ring is 86.24 g, and 64.67 g is actually gold, what is the percent of gold in the super bowl ring? (5 pts)

$$\left(\frac{64.67\text{g}}{86.24\text{g}}\right) \times 100 = 74.99 \% \text{ gold}$$

14. Jermain's lawn is 125.5 feet wide. What is this in meters? (8 pts)

$$125.5 \text{ ft} \left(\frac{12 \text{ in}}{1 \text{ ft}}\right) \left(\frac{2.54 \text{ cm}}{1 \text{ in}}\right) \left(\frac{1 \text{ m}}{100 \text{ cm}}\right) = 38.26 \text{ m} \quad (4 \text{ sig fig, exact conversions})$$

15. During her yoga routine, Mary Ann drank 955 mL of vitamin water. How many dL is this? (6 pts)

$$955 \text{ mL} \left(\frac{1 \text{ L}}{1000 \text{ mL}}\right) \left(\frac{10 \text{ dL}}{1 \text{ L}}\right) = 9.55 \text{ dL}$$

16. Bo, my male yorkie, weighs 9.2 lbs. How many kg is this? (6 pts)

$$9.2 \text{ lb} \left(\frac{454 \text{ g}}{1 \text{ lb}}\right) \left(\frac{1 \text{ kg}}{1000 \text{ g}}\right) = 4.2 \text{ kg}$$

17. Kelly worked 42.5 hours this week. How many minutes is this? (4 pts)

$$42.5 \text{ hrs} \left(\frac{60 \text{ min}}{1 \text{ hr}}\right) = 2550 \text{ min}$$

18. Peyton's super bowl ring has a mass of 86.24 grams and the volume is 5.75 mL. What is the density of the ring? (4 pts)

$$d = \left(\frac{86.24 \text{ g}}{5.75 \text{ mL}} \right) = 15.0 \text{ g/mL}$$

19. Aluminum melts at 933 Kelvin. What is this in degrees Celsius? (3 pts)

$$K = ^\circ\text{C} + 273 \quad 933 \text{ K} = ^\circ\text{C} + 273$$

$$^\circ\text{C} = 933 - 273 = 660 \text{ }^\circ\text{C} \text{ or } 6.60 \times 10^2 \text{ }^\circ\text{C}$$

20. Convert -78.5 °F to °C. (4 pts)

$$^\circ\text{C} = \frac{(^{\circ}\text{F} - 32)}{1.8} \quad ^\circ\text{C} = \frac{(-78.5 - 32)}{1.8} = \frac{(-110.5)}{1.8} = -61.39 \text{ }^\circ\text{C}$$

21. If Sally holds an ice cube, heat transfers from her hand to ice cube. 2 pts

22. Fill in this table for the various atoms: 8 pts (1 pt each)

Atom	# protons	# neutrons	# electrons	Mass number
Carbon-11	6	5	6	11
$^{131}_{53}\text{I}$	53	78	53	131

23. True or False? ^{40}Ca and ^{40}K are isotopes of each other. (1 pt) False

24. What is the charge for a proton? (2 pts)

- a. **Positive** b. neutral c. negative

25. How many atoms are in this formula: $\text{Al}(\text{C}_2\text{H}_3\text{O}_2)_3$? (2 pts) # atoms = 22

$$1 + 6 + 9 + 6 = 22$$

Bonus: If the density of mercury is 13.56 g/mL, what is the volume for 2453.6 grams? (3 pts extra credit)

$$2453.6 \text{ g} \left(\frac{1 \text{ mL}}{13.56 \text{ g}} \right) = 180.9 \text{ mL}$$

Page 3: 26 pts + 3 pts bonus
= 29 pts max