

General Chemistry 1 (CHEM 1141)

Shawnee State University – Fall 2018

September 27, 2018

Exam # 1 A

Name _____

*Please write your full name, and the exam version (1 A) that you have on the scantron sheet !
(Bubble in the best answer choice for each question on the green & white scantron sheet in pencil !)*

Please ☒ check the box next to your correct section number.

Section #: ☐ 1. (Monday Lab, 10:00 AM – 12:53 PM) ☐ 2. (Wednesday Lab, 10:00 AM – 12:53 PM)

 ☐ 3. (Monday Lab, 2:00 PM – 4:53 PM) ☐ 4. (Wednesday Lab, 2:00 PM – 4:53 PM)

 ☐ 6. (Tuesday Lab, 12:30 PM – 3:23 PM)

Multiple Choice: _____ / 50

Q21: _____ / 10

Q22: _____ / 10

Q23: _____ / 10

Q24: _____ / 10

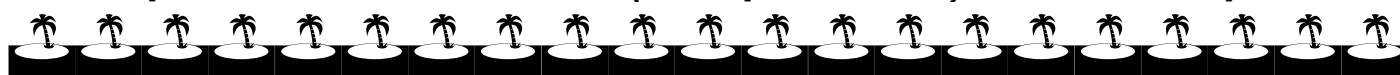
Q25: _____ / 10

BONUS: _____ / 5

TOTAL: _____ / 100



Each problem in this section (multiple choice) is worth 2.5 points !



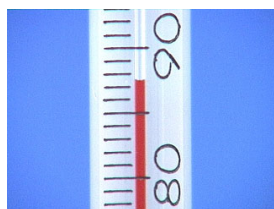
Q1. An example of a homogenous mixture is:

- A) gold
- B) vegetable soup
- C) air
- D) salt

Q2. An example of a chemical change would be:

- A) gasoline freezing
- B) water boiling
- C) acetone evaporating
- D) ethanol burning

Q3. Given the following thermometer close-up, what should the temperature be recorded as?



- A) 80.7 °C
- B) 80.74 °C
- C) 87 °C
- D) 87.4 °C

Q4. How many significant figures does the measurement 0.01030 cm have?

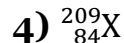
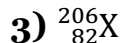
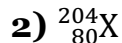
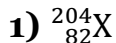
- A) 3
- B) 4
- C) 5
- D) 6

- Q5. Rutherford's gold foil experiment showed:
- A) The mass to charge ratio of an electron could be determined
 - B) The existence of isotopes from multiple peaks in a mass-spectrum
 - C) The atom contains a tiny nucleus with >99% of the total mass
 - D) Metals can be made into extremely thin sheets limited by the dimensions of the electron cloud
- Q6. Which of the following element symbols and names contains an error:
- A) Pb = lead, Au = gold, C = carbon
 - B) Ag = silver, Zn = zinc, Ti = tin
 - C) K = potassium, Na = sodium, F = fluorine
 - D) Li = lithium, V = vanadium, Fe = iron
- Q7. An example of a metalloid would be:
- A) beryllium
 - B) fluorine
 - C) silicon
 - D) lanthanum
- Q8. Predict the charge that element 88, radium (Ra), is likely to make when it forms an ion:
- A) 2+
 - B) 1+
 - C) 1-
 - D) 2-
- Q9. How many moles of gold are present in a 4.00-g sample?
- A) 0.0203
 - B) 49.3
 - C) 2.33×10^{21}
 - D) 4.00

- Q10. How many moles of silver are present in a sample containing 4.17×10^{22} atoms?
- A) 0.417
 - B) 0.0692
 - C) 6.02
 - D) 107.9
- Q11. Which pair of elements do you expect to be the most similar?
- A) nitrogen & oxygen
 - B) lithium & sodium
 - C) argon & bromine
 - D) germanium & arsenic
- Q12. Assuming that the actual value of a lead block is 10.00 g, which of the following data sets would be the most accurate and precise?
- A) Student A: 9.98 g, 10.06 g, & 9.94 g
 - B) Student B: 9.70 g, 10.30 g, & 9.91 g
 - C) Student C: 10.01 g, 10.10 g, & 10.08 g
 - D) Student D: 9.85 g, 9.95 g, & 10.05 g
- Q13. Which of the following represents the *largest* mass of copper?
- A) 1.25×10^{-7} kg
 - B) 1.25 cg
 - C) 1.25×10^{-3} g
 - D) 1.25×10^5 μ g
- Q14. Express the following measurement using scientific notation: 0.000430 m
- A) 4.3×10^4 m
 - B) 4.30×10^{-4} m
 - C) 4.30×10^4 m
 - D) 4.3×10^{-4} m

- Q15. The density of an iron rod is determined and then the iron rod is cut in half and the density of each half is determined. Which of the following statements is true.
- A) The density of each half should be the same as the original uncut iron rod since density is an intensive property.
 - B) The density of each half would be half the density of the original uncut iron rod since density is an extensive property.
 - C) The density of each half should be the same as the original uncut iron rod since density is an extensive property.
 - D) The density of each half would be half the density of the original uncut iron rod since density is an intensive property.

- Q16. Which of the following symbols represent isotopes of the same element ?



- A) 1 & 2
 - B) 1 & 3
 - C) 1 & 4
 - D) 1, 3 & 4
- Q17. The element Fleeminium has two naturally occurring isotopes Fleeminium–299 which has a natural abundance of 45.05 % and an isotopic mass of 298.850 amu and Fleeminium–302 which has a natural abundance of 54.95 % and an isotopic mass of 301.950 amu. The average atomic mass of these two Fleeminium isotopes would be
- A) 299.9 amu
 - B) 300.4 amu
 - C) 300.6 amu
 - D) 301.8 amu

Q18. A pressure of 19.4 lb/in² needs to be converted to units of kg/cm². Identify which of the conversions below is correct:

A) $\frac{14.7 \text{ lb}}{\text{in}^2} \times \frac{2.205 \text{ kg}}{1 \text{ lb}} \times \left(\frac{1 \text{ in}}{2.54 \text{ cm}} \right)^2$

B) $\frac{14.7 \text{ lb}}{\text{in}^2} \times \frac{2.205 \text{ kg}}{1 \text{ lb}} \times \frac{1 \text{ in}}{2.54 \text{ cm}}$

C) $14.7 \text{ lb/in}^2 \times \frac{2.205 \text{ kg}}{1 \text{ lb}} \times \left(\frac{2.54 \text{ cm}}{1 \text{ in}} \right)^2$

D) $14.7 \text{ lb/in}^2 \times \frac{2.205 \text{ kg}}{1 \text{ lb}} \times \frac{2.54 \text{ cm}}{1 \text{ in}}$

Q19. Which of the following does not represent a mole?

A) 12.00 grams of carbon-12

B) 6.022×10^{23} atoms of beryllium

C) 55.85 grams of iron

D) 47.88 atoms of titanium

Q20. The SI unit of measure for temperature is:

A) the degree Celsius

B) the degree Fahrenheit

C) the Joule

D) the Kelvin



Each problem in this section (short answer) is worth 10 points !

All work must be show in order to receive credit !

You must use the factor–label (conversion–factor) method for all conversions !

Be sure to include units where applicable !

All numeric answers must be rounded to the correct number of significant figures !



Q21. Place the correct number of the element or ion next to the letter that best matches.
(use each number only once)

- | | | |
|--------|----------------------------|--------------|
| ___ A. | an alkaline-earth metal | 1. mercury |
| ___ B. | a potassium ion | 2. barium |
| ___ C. | a noble gas element | 3. Na |
| ___ D. | an alkali metal | 4. K^+ |
| ___ E. | an element with 24 protons | 5. germanium |
| ___ F. | a halogen | 6. chlorine |
| ___ G. | a sulfide ion | 7. tin |
| ___ H. | a period 5 element | 8. S^{2-} |
| ___ I. | a transition metal | 9. argon |
| ___ J. | a metalloid | 10. chromium |

Q22. Lead has a density of $11.34 \frac{\text{g}}{\text{mL}}$. How many atoms are contained in a cube of lead that has a volume of 45.0 cm^3 ?

Q23. Fill in the blanks:

- A) An example of an intensive quantity is: _____
- B) The name of the subatomic particle that has about the same mass as the proton: _____
- C) The sub-atomic particle with the smallest mass in an atom: _____
- D) The majority of an atom's mass is contained in the: _____
- E) The element in both group 2A and period 4: _____
- F) Atoms of the same element that only vary in the number of neutrons are called: _____
- G) The symbol for the SI prefix meaning $\times 10^{-9}$ is: ____
- H) Atoms that gain or lose electrons are called: _____
- I) The element with 35 protons is called: _____
- J) Multiple measurements that are close to one another are called: _____

Q24. Complete the following table:

Isotope Symbol (${}^A_ZX^\pm$)	${}^{198}_{80}\text{Hg}^{2+}$			
Ion Name			silver	
Atomic Number (Z)				35
Mass Number (A)		54	109	81
Number of Protons		24	47	
Number of Neutrons				
Number of Electrons		21		36
Net charge	2+		1+	

Q25. Complete the following calculations and round your answers to the correct number of significant figures:

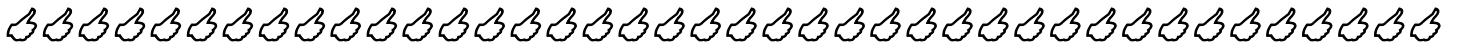
A) $365.079 - 43.20 =$ _____

B) $\frac{89.7 - 2.04}{5.2849 + 3.030} =$ _____

C) $6.307 + 7.0745 - 12.80 =$ _____

D) $\frac{9.0015 \text{ km} \times 2.806 \text{ km}}{2.10 \text{ km} - 0.250 \text{ km}} =$ _____

E) $0.043590 \text{ cm} \times 0.1070 \text{ cm}^2 =$ _____



5 Point Bonus Question



The Honda Insight, a hybrid electric vehicle, has an EPA gas mileage rating of 57 mi/gal. How many kilometers can the Insight travel on the amount of gasoline that would fit in a soda pop can? The volume of a soda pop can is 355 mL.

Hint: 1.000 gal = 3.785 L, 1.000 mi = 1760 m

N_A = 6.022 × 10²³ mol⁻¹

Periodic Table

1		18																																	
IA		VIIIA																																	
1		2																																	
H		He																																	
1.01		4.00																																	
3		4																																	
Li		Be																																	
6.94		9.01																																	
11		12																																	
Na		Mg																																	
22.99		24.31																																	
19		20		21		22		23		24		25		26		27		28		29		30		31		32		33		34		35		36	
K		Ca		Sc		Ti		V		Cr		Mn		Fe		Co		Ni		Cu		Zn		Ga		Ge		As		Se		Br		Kr	
39.1		40.08		44.96		47.88		50.94		52.00		54.94		55.85		58.93		58.69		63.55		65.39		69.72		72.61		74.92		78.96		79.90		83.80	
37		38		39		40		41		42		43		44		45		46		47		48		49		50		51		52		53		54	
Rb		Sr		Y		Zr		Nb		Mo		Tc		Ru		Rh		Pd		Ag		Cd		In		Sn		Sb		Te		I		Xe	
85.47		87.62		88.91		91.22		92.91		95.94		(98)		101.07		102.91		106.42		107.87		112.41		114.82		118.71		121.76		127.6		126.9		131.29	
55		56		57		72		73		74		75		76		77		78		79		80		81		82		83		84		85		86	
Cs		Ba		La*		Hf		Ta		W		Re		Os		Ir		Pt		Au		Hg		Tl		Pb		Bi		Po		At		Rn	
132.9		137.3		138.9		178.5		180.9		183.9		186.2		190.2		192.2		195.1		197.0		200.6		204.4		207.2		209		(209)		(210)		(222)	
87		88		89		104		105		106		107		108		109		110		111															
Fr		Ra		Ac^		Rf		Db		Sg		Bh		Hs		Mt		Ds		Rg															
(223)		(226)		(227)		(261)		(262)		(263)		(264)		(265)		(268)		(271)		(272)															

58		59		60		61		62		63		64		65		66		67		68		69		70		71	
Ce		Pr		Nd		Pm		Sm		Eu		Gd		Tb		Dy		Ho		Er		Tm		Yb		Lu	
140.1		140.9		144.2		(145)		150.4		152.0		157.3		158.9		162.5		164.9		167.3		168.9		173.0		175.0	
90		91		92		93		94		95		96		97		98		99		100		101		102		103	
Th		Pa		U		Np		Pu		Am		Cm		Bk		Cf		Es		Fm		Md		No		Lr	
232.0		(231)		238.0		(237)		(244)		(243)		(247)		(247)		(251)		(252)		(257)		(258)		(259)		(260)	

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