General Chemistry 1 *(CHEM 1141)*

Shawnee State University – Fall 2020

September 24, 2020

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, 10:10 AM)

❒ 2. (Wednesday Lab, 10:10 AM)

❒ 3. (Monday Lab, 5:00 PM)

❒ 4. (Tuesday Lab, 11 AM)

❒ 5. (Thursday Lab, 11 AM)

Multiple Choice:	_____	**/ 50**
Q21:	_____	**/ 10**
Q22:	_____	**/ 10**
Q23:	_____	**/ 10**
Q24:	_____	**/ 10**
Q25:	_____	**/ 10**
BONUS:	_____	**/ 3**
TOTAL:	_____	**/ 100**

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

Q1. Butter is an example of a(n):

A) element

B) compound

C) homogeneous mixture

D) heterogeneous mixture

Q2. Using **SI prefixes**, the value: 0.000 023 mol can also be written as:

A) 230 mmol

B) 23 μmol

C) 2.3 nmol

D) 0.23 pmol

Q3. An example of an **intensive** property is:

A) mass

B) chemical amount

C) volume

D) density

Q4. A sample of mineral has a density of 2.84 g/cm^3. What volume of this mineral would have a mass of 5.5 g?

A) 0.52 mL

B) 1.9 mL

C) 2.7 mL

D) 8.3 mL

Q5. How many significant figures does the measurement: 0.030 A have?

A) 1

B) 2

C) 3

D) 4

Q6. Four students measured the volume of an object that should have been 5.25 mL. Which set of measurements were **inaccurate, yet precise**?

A) 5.90 mL, 3.10 mL, 10.00 mL

B) 5.25 mL, 5.29 mL, 5.45 mL

C) 5.24 mL, 5.34 mL, 5.17 mL

D) 5.10 mL, 5.09 mL, 5.11 mL

Q7. Isotopes are atoms that:

A) Contain more electrons than protons

B) Contain fewer electrons than protons

C) Contain the same number of protons as neutrons

D) Contain the same number of protons, but varying neutrons

Q8. The element in the **fourth period** and **group 6A** is:

A) Se

B) Hf

C) Pb

D) Cr

Q9. Which pair of elements is likely to have similar chemical properties?

A) Al & Ca

B) Sr & Rb

C) Mg & Al

D) Sr & Mg

Q10. Which is NOT an example of a diatomic element?

A) hydrogen

B) nitrogen

C) chlorine

D) carbon

Q11. Which of the following substance's names does NOT begin with iron(II) ...

A) Fe_2O_3

B) $FeSO_4$

C) $Fe(OH)_2$

D) $Fe_3(PO_4)_2$

Q12. Which of the following substances is better known as sulfuric acid?

A) $H_2S(aq)$

B) $H_2SO_3(aq)$

C) $H_2SO_4(aq)$

D) $HSO_2(aq)$

Q13. Which of the following substances has a molar mass of 262.86 g/mol:

A) $Ca(NO_3)_2$

B) H_3PO_4

C) $Mg_3(PO_4)_2$

D) $ZnCl_2$

Q14. What is the percent by mass of oxygen in pyruvic acid, $C_3H_4O_3$?

A) 16.0 %

B) 30.4 %

C) 48.0 %

D) 54.5 %

Q15. Calculate the atomic mass of element "X", if it has two naturally occurring isotopes with the following masses and natural abundances:

X-45	**44.8776 amu**	**32.88%**
X-47	**46.9443 amu**	**67.12%**

A) 46.26 amu

B) 45.91 amu

C) 46.34 amu

D) 46.84 amu

Q16. A piece of metal ore weighs 9.25 g. When a student places it into a graduated cylinder containing water, the liquid level rises from 21.25 mL to 26.47 mL. What is the density of the ore?

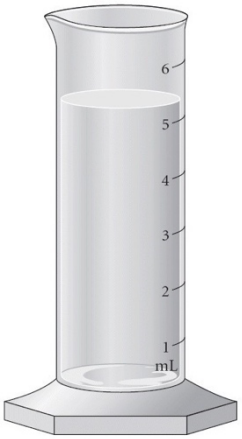
A) 0.340 g/mL

B) 0.564 g/mL

C) 1.77 g/mL

D) 2.94 g/mL

Q17. Read the water level with the correct number of significant figures.



A) 5 mL

B) 5.3 mL

C) 5.32 mL

D) 5.320 mL

Q18. How many zinc atoms are contained in 3.75 moles of zinc?

A) 1.23×10^{24} zinc atoms

B) 2.26×10^{24} zinc atoms

C) 2.26×10^{23} zinc atoms

D) 9.03×10^{24} zinc atoms

E) 6.50×10^{25} zinc atoms

Q19. Which of the following is equal to exactly Avogadro's number of atoms?

A) 8.00 grams of oxygen

B) 30.69 grams of nickel

C) 4.003 grams of helium

D) 11.99 grams of sodium

E) 35.00 grams of bromine

Q20. The correct answer (reported to the proper number of significant figures) to the following is:

$7.3 \times 4.23 =$ _____

A) 31

B) 30.9

C) 1.7

D) 30.88

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. (A) Using the conversion-factor method, convert a density of 808 lb/ft^3 to g/cm^3.
Hint: 1 lb = 453.6 g, 1 ft = 12 in, 1 in = 2.54 cm

(B) What volume would 23.10 g of this sample occupy?

Q22. How many protons, neutrons, and electrons do the following contain:

A) an **atom** of chlorine-38, $^{38}_{17}Cl$ *p*: _____ *n*: _____ *e*: _____

B) an **ion** of aluminum-27 *p*: _____ *n*: _____ *e*: _____

C) an **ion** of sulfur-30 *p*: _____ *n*: _____ *e*: _____

Note: for the **ions**, be sure to use the **correct charge** that the ion forms!

Q23. (A) How many (#) **atoms of neon, Ne(g),** are contained in a 14.0 g sample of neon?

(B) How many (#) **molecules of $H_2O(g)$**, are contained in a 14.0 g sample of water?

(C) How many (#) **atoms of hydrogen** are contained in a 14.0 g sample of water?

Q24. Provide names for the following substances:

A) $CaSO_3 \cdot 2H_2O$ _____

B) N_3Cl_7 _____

C) $Fe(NO_2)_2$ _____

D) $Cu(HCO_3)_2$ _____

E) Br_2N_9 _____

Q25. An ionic compound is found to contain 68.4 % chromium (Cr) by mass and 31.6 % oxygen by mass.

(A) determine its empirical formula:

(B) what is the systematic name given to this substance?

3 Point Bonus Question

Calculate to the correct number of digits (and units) the expression:

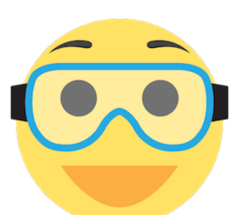
$$\frac{103.20\text{ g}-101.10\text{ g}}{0.03200\text{ mL}} =$$

Exam checklist:

(Check the boxes to certify the following:)

- ❒ My full name is written legibly on the front page
- ❒ My correct lab section has been indicated on the front page
- ❒ My full name is written legibly on the scantron sheet
- ❒ My exam version (A, B, C, or D) is written on the scantron sheet
- ❒ I have shown work for all problems (where appropriate), paying attention to
    - Significant figures / decimal places
    - Units
- ❒ I have used the conversion-factor method for all conversions
- ❒ If I have torn off the back page (periodic table), I will not turn it in with my exam!

Thank-you from the Chemistry Professors and Good Luck!



Useful information:

$N_A = 6.022 \times 10^{23}\ mol^{-1}$

Periodic Table of the Elements

IA	IIA											IIIA	IVA	VA	VIA	VIIA	VIIIA
1												*13*	*14*	*15*	*16*	*17*	*18*
1 **H** 1.008	2											5 **B** 10.81	6 **C** 12.01	7 **N** 14.01	8 **O** 16.00	9 **F** 19.00	2 **He** 4.003
3 **Li** 6.941	4 **Be** 9.012											13 **Al** 26.98	14 **Si** 28.09	15 **P** 30.97	16 **S** 32.07	17 **Cl** 35.45	10 **Ne** 20.18
11 **Na** 22.99	12 **Mg** 24.31	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	31 **Ga** 69.72	32 **Ge** 72.61	33 **As** 74.92160	34 **Se** 78.96	35 **Br** 79.90	18 **Ar** 39.95
19 **K** 39.10	20 **Ca** 40.08	21 **Sc** 44.96	22 **Ti** 47.87	23 **V** 50.94	24 **Cr** 52.00	25 **Mn** 54.94	26 **Fe** 55.85	27 **Co** 58.93	28 **Ni** 58.69	29 **Cu** 63.55	30 **Zn** 65.39	49 **In** 114.8	50 **Sn** 118.7	51 **Sb** 121.8	52 **Te** 127.60	53 **I** 126.9	36 **Kr** 83.80
37 **Rb** 85.47	38 **Sr** 87.62	39 **Y** 88.91	40 **Zr** 91.22	41 **Nb** 92.91	42 **Mo** 95.94	43 **Tc** [98]	44 **Ru** 101.1	45 **Rh** 102.9	46 **Pd** 106.4	47 **Ag** 107.9	48 **Cd** 112.4	81 **Tl** 204.4	82 **Pb** 207.2	83 **Bi** 209.0	84 **Po** [210]	85 **At** [210]	54 **Xe** 131.3
55 **Cs** 132.9	56 **Ba*** 137.3	71 **Lu** 175.0	72 **Hf** 178.5	73 **Ta** 180.9	74 **W** 183.8	75 **Re** 186.2	76 **Os** 190.2	77 **Ir** 192.2	78 **Pt** 195.1	79 **Au** 197.0	80 **Hg** 200.6	113	114	115	116	117	86 **Rn** [222]
87 **Fr** [223]	88 **Ra**** [226]	103 **Lr** [262]	104 **Rf** [261]	105 **Db** [262]	106 **Sg** [266]	107 **Bh** [264]	108 **Hs** [265]	109 **Mt** [268]	110 [269]	111 [272]	112 [277]		[285]		[289]		118 [293]

*	57 **La** 138.9	58 **Ce** 140.1	59 **Pr** 140.9	60 **Nd** 144.2	61 **Pm** [145]	62 **Sm** 150.4	63 **Eu** 152.0	64 **Gd** 157.3	65 **Tb** 158.9	66 **Dy** 162.50	67 **Ho** 164.9	68 **Er** 167.3	69 **Tm** 168.9	70 **Yb** 173.0
**	89 **Ac** [227]	90 **Th** 232.0	91 **Pa** 231.0	92 **U** 238.0	93 **Np** [237]	94 **Pu** [244]	95 **Am** [243]	96 **Cm** [247]	97 **Bk** [247]	98 **Cf** [251]	99 **Es** [252]	100 **Fm** [257]	101 **Md** [258]	102 **No** [259]