

Name: KEY

CHEM 1110.20787
Test 1, Form A
Spring 2013

Part1 - Short Answer (35 pts)

1. (15 pts) Complete the table below

Element Name	Symbol	Atomic Number	Number of Neutrons	Mass Number
Copper	Cu	29	39	68
Phosphorus	P	15	17	32
aluminum	Al	13	15	28
Neon	Ne	10	12	22
lithium	Li	3	4	7

2. (10 pts) In the periodic table below, label the Alkali Metals (P), the Chalcogens (Q), the Noble Gases (R) the Halogens (S), and the Alkaline Earth Metals (T) using the letter given in parenthesis.

	P IA																	R VIII A	
1	H 1.008																		2 He 4.00
2	3 Li 6.94	4 Be 9.01										5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18		
3	11 Na 22.99	12 Mg 24.31										13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.06	17 Cl 35.45	18 Ar 39.95		
4	19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.90	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.71	29 Cu 63.55	30 Zn 65.37	31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80	
5	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 112.40	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.60	53 I 126.90	54 Xe 131.30	
6	55 Cs 132.9	56 Ba 137.3	71 Lu 175	72 Hf 178.5	73 Ta 181	74 W 183.9	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197	80 Hg 200.59	81 Tl 204.4	82 Pb 207.2	83 Bi 209	84 Po [209]	85 At [210]	86 Rn [222]	
7	87 Fr [223]	88 Ra [226]	103 Lr [262]	104 Rf [267]	105 Db [268]	106 Sg [271]	107 Bh [272]	108 Hs [270]	109 Mt [276]	110 Ds [281]	111 Rg [280]	112 Uub [285]	113 Uut [284]	114 Uuq [289]	115 Uup [288]	116 Uuh [293]		118 Uuo [294]	

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	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.93	68 Er 167.3	69 Tm 168.9	70 Yb 173
89 Ac [227]	90 Th 232	91 Pa [231]	92 U 238	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]

3. (6 pts) Write the measurements in scientific notation with correct significant figures.

- a. 1005 m $1.005 \times 10^3 \text{ m}$
b. 0.00560 g $5.60 \times 10^{-3} \text{ g}$
c. 230.0 °C $2.300 \times 10^2 \text{ °C}$

4. (4 pts) What is the most massive part of the atom? nucleus

Part 2 - Multiple Choice (20 pts): Circle the best answer.

1. Elements with similar properties on the periodic table are organized into _____.

- a. Pods
B b. Groups
c. Rows
d. Dimensions

2. A temperature of 303K is _____ degrees Celsius

- a. 303
C b. 576
c. 30
d. 0

3. Which is not a physical property?

- D a. Boiling
b. Freezing
c. Filtering
d. Burning

4. Which experiment determined that the nucleus is small and positively charged?

- B a. Millikan's Oil Drop
b. Rutherford's Gold Foil
c. Thomson's Cathode Ray Tube
d. Rontgen's X-ray

5. Which of the following series of elemental symbols lists a metal, a nonmetal, and a metalloid, respectively?

- C a. Na, P, Cl
b. Ca, Cu, Si
c. K, C, As
d. Mg, O, S

Part 3 - Calculations (45 pts): Clearly and neatly show all work for full credit.

1. (10 pts) An unknown element has been discovered on the Planet of the Apes. Given the following information, what is the average atomic mass of this new element?

Isotope Mass	Percent Abundance
78.569 amu	45.35%
79.609 amu	33.98%
82.569 amu	20.67%

$$\begin{aligned} (78.569 \text{ amu})(0.4535) &= 35.63 \text{ amu} \\ (79.609 \text{ amu})(0.3398) &= 27.05 \text{ amu} \\ (82.569 \text{ amu})(0.2067) &= 17.07 \text{ amu} \\ \hline &79.75 \text{ amu} \end{aligned}$$

2. (10 pts) What is the mass in grams of a 5.68×10^{24} atoms of arsenic (As)?

$$5.68 \times 10^{24} \text{ atoms As} \times \frac{1 \text{ mol As}}{6.022 \times 10^{23} \text{ atoms As}} \times \frac{74.92 \text{ g As}}{1 \text{ mol As}} = 707 \text{ g As}$$

3. (15 pts) How many atoms are there in 15.9 mg of lead (Pb)?

$$15.9 \text{ mg Pb} \times \frac{10^{-3} \text{ g}}{1 \text{ mg}} \times \frac{1 \text{ mol Pb}}{207.2 \text{ g Pb}} \times \frac{6.022 \times 10^{23} \text{ atoms Pb}}{1 \text{ mol Pb}} = 4.62 \times 10^{19} \text{ atoms Pb}$$

4. (10 pts) A typical marshmallow has a density of 0.37 g/cm^3 . What is the volume of the Stay Puft Marshmallow Man in cubic meters (m^3) if his mass is 5694 kg? (hint, first convert kg to g)

$$5694 \text{ kg} \times \frac{10^3 \text{ g}}{1 \text{ kg}} \times \frac{1 \text{ cm}^3}{0.37 \text{ g}} \times \left(\frac{10^{-2} \text{ m}}{1 \text{ cm}} \right)^3 = 15.4 \text{ m}^3$$

BONUS (2 pts): Give the names of four elements that exist as gases at room temperature.

hydrogen	chlorine
helium	neon
nitrogen	argon
oxygen	krypton
fluorine	xenon
	radon