

Exam 1 For Chem 1124, Fall 2011

Name Key

~~42~~ ~~47~~ 43

By submitting this exam, I affirm that I have neither given nor received unauthorized aid on this assignment.

You must show all work for credit. Express each answer to the correct number of significant figures.

Useful information: $1 \text{ m} = 1.094 \text{ yd}$, $^{\circ}\text{C} = \frac{5}{9} (^{\circ}\text{F} - 32)$, $^{\circ}\text{F} = \frac{9}{5} (^{\circ}\text{C}) + 32$, $1 \text{ in} = 2.54 \text{ cm}$, $1 \text{ kg} = 2.2 \text{ lbs}$, $1 \text{ mL} = 1 \text{ cm}^3$, $1 \text{ L} = 1.056 \text{ qt}$, $1 \text{ mile} = 1.609 \text{ km}$,

(1)(4 points) Who is credited with the discovery of the electron and how did he do it?

J.J. Thompson: He studied the effects of electric and magnetic fields on cathode rays

(2)(2 points) Fill in the following table

Species	protons	neutrons	electrons
^{15}N	7	8	7
^{19}F	9	10	9
$^{23}\text{Na}^+$	11	12	10

(3)(5 points) List the 5 of the base SI units and the property each one measures

answer 1 m/s

(4)(4 points) Conversions

(a) 251 miles to km $\frac{251 \text{ miles}}{1} \times \frac{1.609 \text{ km}}{\text{mile}} = 404 \text{ km}$

X(b) If the amount of fluid a patient receives is listed as 15 mL/kg, each day, how much fluid should a 175 lb patient receive in a day?

~~175~~ $\frac{175 \text{ lb}}{1} \times \frac{1 \text{ kg}}{2.2 \text{ lbs}} = 79.5 \text{ kg}$

$\frac{15 \text{ mL}}{\text{kg}} \times 79.5 \text{ kg} = \text{~~1192.5~~} 1.19 \times 10^3 \text{ mL each day}$

(5)(5 points) List 4 points of Dalton's Atomic theory

answers vary

(6)(5 points) What is the volume of a 10.0 kg steel weight if steel has a density of 5.5 g/mL?

$$\frac{10.0 \text{ kg}}{1} \times \frac{1000 \text{ g}}{1 \text{ kg}} = 1.00 \times 10^4 \text{ g}$$
$$\frac{1.00 \times 10^4 \text{ g}}{1} \times \frac{1 \text{ mL}}{5.5 \text{ g}} = 1.8 \times 10^3 \text{ mL} \quad 1.8 \text{ L}$$

(7)(4 points) Give an example of each

(a) a compound _____

ANSWER VARS

(b) a heterogeneous mixture _____

(8)(3 pts) Fill in the following table of electron configurations

element	n=1	n=2	n=3
aluminum	2	8	3
C	2	4	
Ne	2	8	
Lithium	2	1	

(9)(4pts) A sample contains 4.50 g of LiCl.

(a) How many moles of LiCl are in the sample?

$$\frac{4.50 \text{ g}}{1} \times \frac{1 \text{ mole}}{42.39 \text{ g}} = 0.106 \text{ moles}$$

$$\begin{array}{r} 6.941 \text{ g/m} \\ + 35.45 \text{ g/m} \\ \hline 42.39 \text{ g/m} \end{array}$$

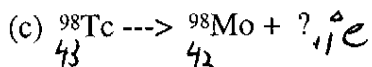
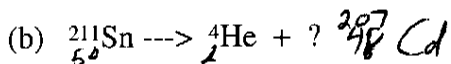
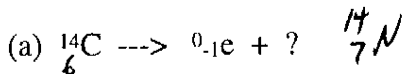
(b) How many lithium ions are in the sample?

$$0.106 \text{ moles Li}^+ \times \frac{6.022 \times 10^{23} \text{ ions}}{\text{mole}} = 6.39 \times 10^{22} \text{ Li}^+ \text{ ions}$$

(10)(4 points) Explain 1 use of radioactivity in medicine.

answers vary

(11)(3 pts) Complete the following nuclear equations



(12)(6 points) Complete the following table

Compound	Name
Li_2CO_3	lithium carbonate
$\text{Fe}_2(\text{CO}_3)_3$	iron(III) carbonate
HNO_3	nitric acid
N_2S_4	dinitrogen tetrasulfide
H_3PO_3	phosphorus acid
CS_2	carbon disulfide

Extra Credit:

$$\frac{5,000,000 \text{ Bq}}{5.00 \text{ g}} \approx \frac{1,000,000 \text{ Bq}}{1.00 \text{ g sample}}$$

$$t_{1/2} = 12 \text{ years}$$

- after 12 years 500,000 Bq
- after 24 years 250,000 Bq
- after 36 years 125,000 Bq
- after 48 years 62,500 Bq