

CHM 151 Exam 1 - Chapters 1, 2, 5, and 6
Show all work and clearly mark answers to receive credit!

1) (5 pts) Circle the elements below that are **noble gases**. (Circle all that apply.)

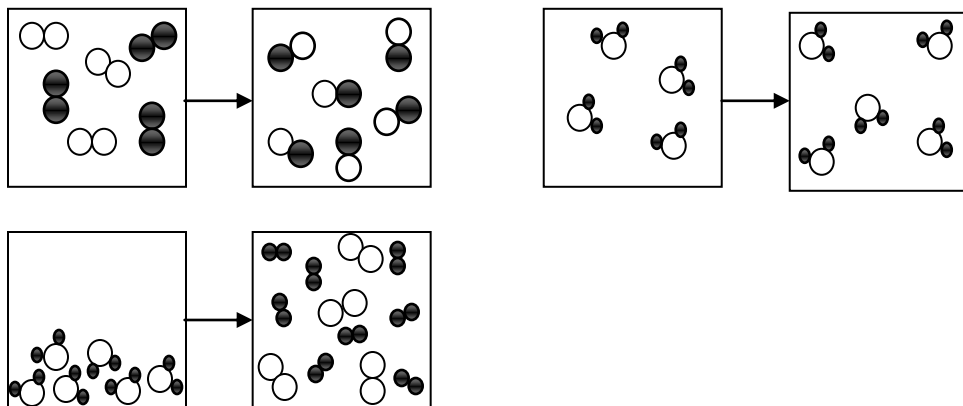
Ne F Na Te Br Xe Fe Mg Kr Rb

___ 2) (5 pts) Which of the following are chemical processes?

1. rusting of a nail
2. freezing of water
3. decomposition of water into hydrogen and oxygen gases
4. condensation of oxygen gas

- a. 1 & 2
- b. 1 & 3
- c. 1 & 4
- d. 1, 3, & 4
- e. 2, 3, & 4

3) (5 pts) Circle the reaction below that represents a **physical** change.



4) (3 pts) Circle the numbers below that have exactly **3** significant figures.

2309 1.341 x 10³ 1.20 0.087 0.100 1200

5) (8 pts) Complete the following conversions (**SHOW ALL WORK**):

a) 56.78 cm² = _____ m²

b) 124.00 km = _____ mm

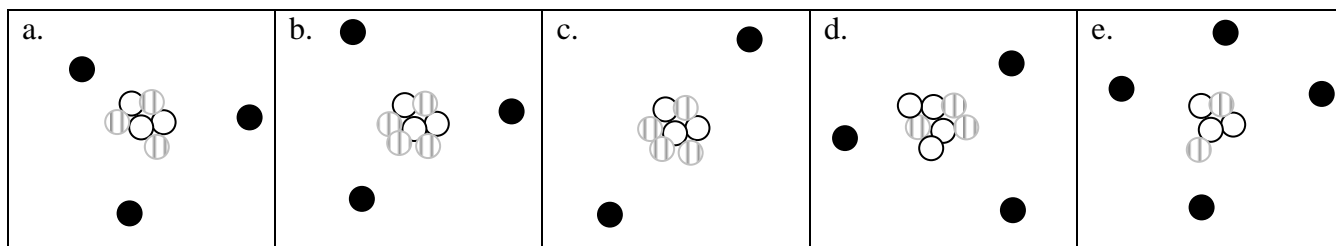
c) 13.5 lb = _____ kg
 (1 lb = 453.59237 g)

Name: _____

Section: _____

___ 6) (5 pts) Which one of the following pictures represents ${}^7\text{Li}^+$?

○ Proton ⊕ Neutron ● Electron



7) (18 pts) True or False: circle your answer to each statement.

T F ${}^{24}\text{Mg}$ represents a neutral atom.

T F ${}^{16}\text{O}^{2-}$ and ${}^{16}\text{N}^{3-}$ have the same number of protons.

T F ${}^{53}\text{Cu}^{2+}$ has 27 electrons.

T F ${}^{11}\text{B}^{3+}$ has 11 neutrons.

T F The mass number of an atom is equal to the number of protons. The atomic number of an atom is equal to the sum of the number of protons and neutrons.

T F Rutherford's work showed that atoms contained negatively charged particles called electrons.

T F NaF is an ionic compound.

T F NO_3 is an ionic compound.

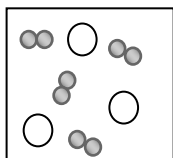
T F Planck contributed the idea of quantized energy to our current understanding of the atom.

8) (6 pts) Element X has two stable isotopes. The first isotope has a mass of 68.93 amu and an abundance of 60.11%. The second isotope has a mass of 70.92 amu and an abundance of 39.89%. What is the average atomic mass of this element? What element is it?

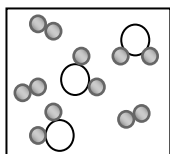
Average atomic mass (you must show your work for this part!): _____ amu

Element: _____

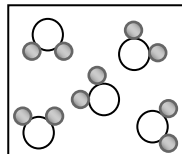
___ 9) (4 pts) In the boxes below, atoms are represented by circles. Circle the box or boxes that contain a **mixture**?



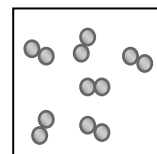
a.



b.



c.



d.

Name: _____

Section: _____

10) (6 pts) Calculate the wavelength (in meters) of an empty coke can if its mass is 0.01396 kg and its velocity is measured to be 1.6129 m/s.

11) (10 pts) Write electron configurations for atoms or ions of the following elements:

B (long hand): _____

Cr (short hand): _____

Ca (short hand): _____

F⁻ (long hand): _____

Mn²⁺ (short hand): _____

12) (8 pts) Indicate the number of valence electrons in atoms of the following elements:

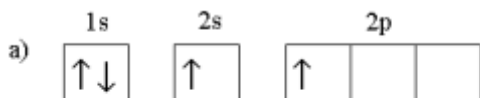
Rubidium _____

Magnesium _____

Carbon _____

Argon _____

___ 13) (5 pts) Which orbital diagram represents a violation of the Aufbau Principle for an atom in its ground state?



14) (12 pts) Periodic Trends: Circle the atom or ion that has the largest value of the property listed.

Radius: Te Br Ar

Radius: Cl⁻ S²⁻ P³⁻

Radius: Mg²⁺ Mg

Ionization Energy: S Si Al

Electron Affinity: Cl F Br

Lattice Energy: LiCl MgCl₂ AlCl₃