Chem 1013 Exam 1 version B

Your name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 1 pt

1. **Atomic dimensions, parts and relations between them (7 pts)**
2. What subatomic particles reside in the atomic nucleus ? \_\_\_\_\_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Most of the mass of an atom resides in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Of the three subatomic particles in the atom, which is the lightest? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Two of the three subatomic particles in an atom weigh the same. Which ones ?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

e) The ratio of the diameter of an atom to its nucleus is ~ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2. Nomenclature of the Elements (11 pts)**

a) An isotope of a specific element has as particular count of: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) In the modern theory of the atom a specific element has a fixed count of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) Mass number, M= \_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

14

Si

28.09

d) Which element has an atomic number of 15 ? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

e) The 28.09 in the Periodic Table representation of Si is the:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

f) Provide names or symbols for the elements listed below:

Sodium\_\_\_\_\_\_ Cl\_\_\_\_\_\_\_\_\_\_\_\_\_\_ silver\_\_\_\_ K\_\_\_\_\_\_\_\_\_\_\_\_ Lithium \_\_\_

3. **Atomic Bookkeeping ( 9 pts)**

Fill in the missing pieces to the table below: (3 pts per correct line)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Atomic # | Mass # | symbol | #p | #n | #e | Atom charge |
|  |  |  | 29 | 35 |  | 0 |
|  | 32 |  |  |  | 16 | 0 |
| 9 |  |  |  | 10 |  | -1 |

**4. Light, Frequency, Wavelength and Color (10 pts)**

a) Using the new theory of light, rank these colors from lowest to highest in energy: 2 pts

Yellow Green Blue Red \_\_\_\_\_\_\_\_\_\_<\_\_\_\_\_\_\_\_\_\_<\_\_\_\_\_\_\_\_\_\_<\_\_\_\_\_\_\_

Low energy High energy

b) In the old theory of light, light is considered to be a(n):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) In Einstein’s new theory of light is now a massless particle called a(n)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

d) In the new theory of light, light energy is proportional to: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

e) Using the new theory of light, rank these wavelengths from lowest to highest energy: (2 pts)

800 nm 200 nm 400 nm 600 nm \_\_\_\_\_\_\_\_\_\_<\_\_\_\_\_\_\_\_\_\_\_<\_\_\_\_\_\_\_\_\_\_<\_\_\_\_\_\_\_\_\_\_\_ low energy high energy

1. Using the new theory of light, rank these frequencies from lowest to highest energy (2 pts)

20 GHz 90 GHz 40 GHz 10 GHz \_\_\_\_\_\_\_\_<\_\_\_\_\_\_\_\_\_\_\_\_\_<\_\_\_\_\_\_\_\_\_\_<\_\_\_\_\_\_\_\_\_

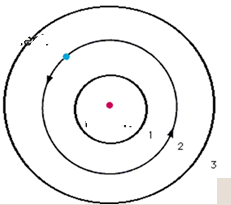
Low energy high energy

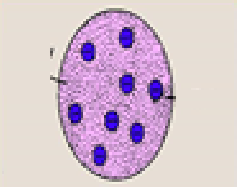
1. The frequency of blue light is: **higher the same lower**  than the frequency of red light.

\_\_\_/37 (circle choice)

**5. Atomic Models (8 pts)**

1. Match the pictures to the atomic model names below:
2. Thomson’s `Plum Pudding’ (chocolate chip cookie) atom
3. Rutherford’s atom
4. Bohr’s atom







\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Which of the three models listed made the `+’ charge in the `cookie’ dough? \_\_\_\_\_\_\_\_\_\_\_\_
2. In Bohr’s atom, emission of light occurs when **n** goes from : (circle choice):

**higher n🡪 lower n lower n🡪 higher n positive n🡪 negative n**

1. Bohr’s atom successfully explained the behavior of which element(s) ? \_\_\_\_\_\_\_\_\_\_\_\_\_
2. Name one failure of the Bohr atom: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**6. Periodic Table Geography (9 pts)**

1. The three main kinds of element classes are:

1)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 3)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Region Y

1 2 7 8



🡨 Region X 🡪

**Use the Periodic Table above to answer the questions below:**

1. Which column # contains alkaline earths?: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Name of column 7\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Name of region Y (circled) ? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What is Region X called ? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Which column # contains inert (noble gases) ? \_\_\_\_\_\_
6. Name of column 1\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**7. Singing the spdf song and Lewis dots (23 pts total)**

1. Using your own spdf Periodic Table map:

Write the complete ground state electronic configurations for: (3 pts each)

Al\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ O\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Na\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**7. Singing the spdf song and Lewis dots (continued)**

1. Write the abbreviated ground state electronic configurations for: (2 pts each)

Mg \_\_\_\_\_\_\_\_\_\_\_ Cl\_\_\_\_\_\_\_\_\_\_\_\_\_ Si\_\_\_\_\_\_\_\_\_\_\_\_

1. Correct the errors in the configurations below: (2 pts each)
2. 0s23s22p3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (2) 1s22s23p1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Which element has the configuration: [Ar] 4s2 ? \_\_\_\_\_\_\_\_\_\_\_\_
4. Provide the equivalent Lewis dot pictures for: (1 pt each/3 pts total)

C P Cl

**8. Ionic compounds (9 pts)**

1. Write the correct ionic formulas for compounds made from: (3 pts each/9 pts total)
2. Ca and O \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Li and N \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Mg and Br \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**9. Covalent Compounds (15 pts)**

1. Draw the correct Lewis structure for: (2 pts each/6 pts total)

**N2 O2 F2**

1. Draw the correct Lewis structure for: (3 pts each/ 6 pts total)

**CO CO2**

H H

| |

1. Does the compound to right satisfy HONC rules? H-C-O-O-H Yes No
2. How many electrons are bonding electrons in: H-C≡C-H \_\_\_\_\_\_\_
3. **True/False:** Any day doing chemistry is a good day **T T FU** (circle answer)

**\_\_\_/53**