

6 <b>C</b> Carbon	7 <b>N</b> Nitrogen	1 <b>H</b> Hydrogen	16 <b>S</b> Sulfur
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**Chemistry Department**

# **S3 Chemistry**

**Chemical Changes and Structure**

**(a) Atomic Structure**

**HOMEWORK**



**Homework 1****The Periodic Table****/10**

1.

A Sodium	B Iron	C Argon	D Chlorine
E Fluorine	F Lithium	G Nitrogen	H Zinc

- a) Which two elements are transition metals? (1)  
b) Which two elements are halogens? (1)  
c) Which three elements are in the second period? (1)

2. Using the information on melting and boiling points of elements on page 3 of the data booklet, state if the following will be solid, liquid or gas at room temperature (20°C).

- a) Iodine (1)  
b) Bromine (1)

3. For each of the following lists of elements decide whether the elements are in the same group or period?

- a) Phosphorus, aluminium, chlorine (1)  
b) Chlorine, iodine, fluorine (1)

4. Which element in the following lists does not have similar properties to the others?

- A. calcium    B. aluminium    C. strontium    D. magnesium (1)

5. Which of the following compounds contains both a transition metal ion and a halide (halogen) ion?

- A. Sodium chloride  
B. Iron oxide  
C. Magnesium bromide  
D. Cobalt fluoride (1)

6. Which of the following compounds contains oxygen?

- A Calcium chloride  
B Lithium sulfide  
C Potassium nitrate  
D Sodium chloride (1)

## Homework 2

## Elements/Compounds and Mixtures

/10

1. Which of the following elements is a liquid at room temperature?

**Silver or Mercury**

(1)

2. Which of the following substances is a mixture?

**Air or Water**

(1)

3. When sugar dissolve in tea, is the sugar a

**Solute or Solvent**

(1)

4. Write the symbol (including state symbols) for each of the following

(a) Argon gas

(b) Ice

(c) Liquid gallium

(3)

5. Draw **and label** a diagram to show how a mixture of sand and water would be separated.

**Your diagram should indicate where each substance is collected.**

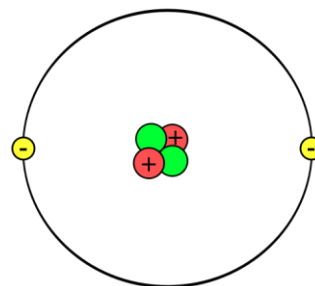
(4)

### Homework 3

### Atomic Structure

/15

1. a) Copy and label the diagram of an atom.  
b) Explain why the atom is neutral.  
c) Which element is represented in the diagram?



(3)

2. Copy and complete this table:

Particle	Charge	Mass	Location in atom
proton		1	nucleus
	0		
		almost 0	

(3)

3. a) Copy and complete the following table:

Element	Atomic Number	Mass Number	Number of protons	Number of neutrons	Number of electrons
Ne		22			
N				7	
Ca		40			
A	4	9			
B		14			6
C		89	36		

(6)

- b) Identify elements A, B, & C.

(3)

1. Write the electron arrangements for the following atoms:

- a) Chlorine
- b) Neon
- c) Hydrogen
- d) Calcium

(4)

2. Which of the following is the electron arrangement of a metal element?

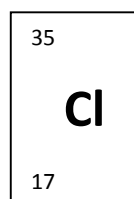
- A. 2, 8
- B. 2, 8, 1
- C. 2, 8, 7
- D. 2, 8, 8

(1)

3. This symbol gives some information about an atom:

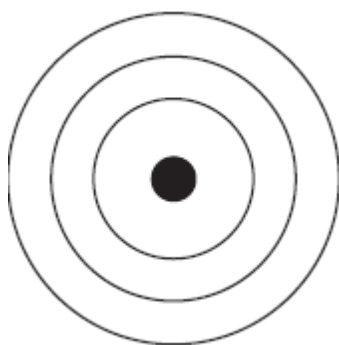
Complete the following:

- i) name of element
- ii) number of protons
- iii) number of neutrons
- iv) number of electrons
- v) electron arrangement
- vi) group number



(6)

4. Electrons are arranged in energy levels. Copy and complete the diagram to show how the electrons are arranged in a sodium atom. (You may wish to use the data booklet to help you.)



●	= nucleus
X	= electron

(1)

5. An element has the electron arrangement 2, 5. What group is this element in?

(1)

The grid below shows some information about particles. Use the information to answer questions 1, 2 and 3.

Particle	Number of		
	protons	neutrons	electrons
A	11	12	11
B	9	10	9
C	11	13	11
D	19	20	18
E	9	10	10

- Which particle is a negative ion? (1)
- Identify the 2 particles that are isotopes. (1)
- Which particle has a mass number 24? (1)
- Ions are formed by atoms losing or gaining electrons. In each of the following changes, say how many electrons are involved and whether they are gained or lost.
  - Na atom changes to  $\text{Na}^+$  ion.
  - F atom changes to  $\text{F}^-$  ion.
  - S atom changes to  $\text{S}^{2-}$  ion.
  - Al atom changes to  $\text{Al}^{3+}$  ion.(4)
- Write each of the following atoms in nuclide notation:
  - An oxygen atom with 10 neutrons
  - An atom with atomic number 6 and with 7 neutrons(2)
- A natural sample of Neon has an average atomic mass of 20.2. One isotope has a mass number of 20 and the other has a mass number of 21. What is the mass number of the most common type of atom in the sample of Neon? (1)