

# SOLUTIONS

PRACTICE A: 1. Which of the following characteristics describe an atom in terms of the simplified (Bohr-Rutherford) model?

1. The number of electrons is equal to the number of protons.
2. The number of protons is equal to the number of neutrons.
3. The nucleus is made up of neutrons, protons and electrons.
4. The nucleus is made up of neutrons and electrons.
5. The nucleus is made up of protons and neutrons.
6. Protons revolve around the nucleus.
7. Electrons revolve around the nucleus.

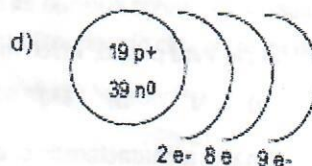
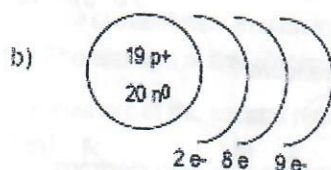
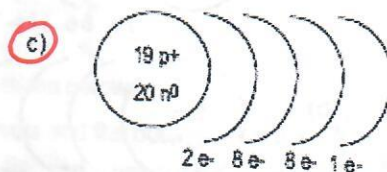
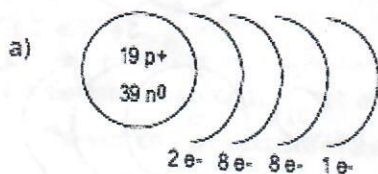
a) 2, 5, and 7

b) 1, 4, and 6

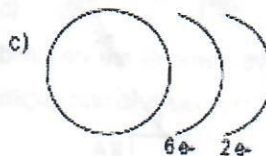
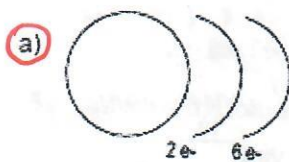
c) 1, 2, and 3

**d) 1, 5, and 7**

2. Which of the following best represents the Bohr-Rutherford model of a potassium atom,  ${}_{19}\text{K}^{39}$ ?

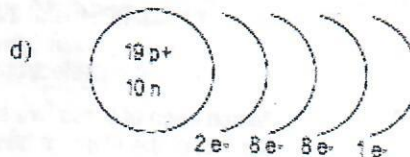
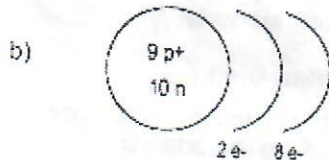
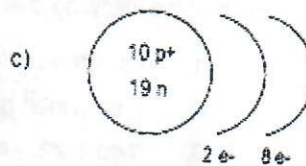


3. The study of the behaviour of matter has made it possible to develop simple models such as the Bohr-Rutherford model of the atom. If the atomic number of oxygen is 8 and its mass number is 16, which diagram represents the oxygen atom according to the Bohr-Rutherford model?

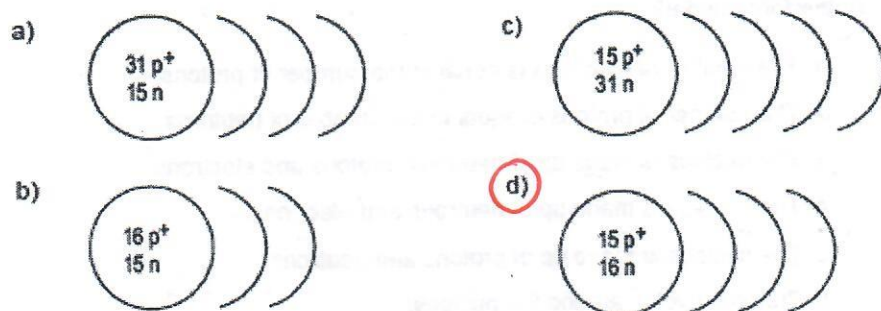


4. The atomic number of fluorine (F) is 9 and its mass number is 19.

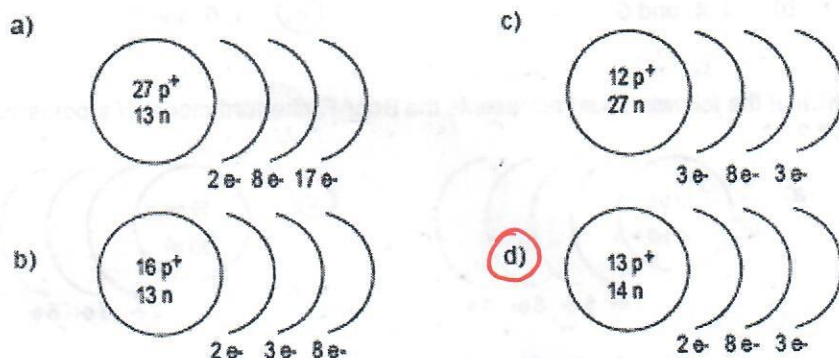
Which of these diagrams represents the simplified model (Bohr-Rutherford) of a fluorine atom?



5. Which of the following diagrams best represents the Bohr-Rutherford model of the phosphorus atom (P)?



6. Which of the following diagrams best represents the aluminum (Al) atom according to the Bohr-Rutherford model?



PRACTICE B:

- In the third period, which metal is the most reactive?
  - Al
  - Mg
  - Cl
  - Na
- What is a characteristic of an element possessing 8 valence electrons?
  - It easily captures electrons
  - It is very reactive
  - It easily gives up an electron
  - It is chemically inert.
- Which of the following elements is most likely to gain an electron?
  - Li
  - F
  - Ne
  - B
- Five elements are identified in the following periodic table:

I A 1	II A 2	III A 13	IV A 14	V A 15	VIA 16	VII A 17	VIII A 18
		B 10.81			O 16.00		
11 Na 22.99							18 Ar 39.95
	20 Ca 40.08						

Each of the following characteristics describes one of these elements.

- Its outermost energy level contains 6 electrons. **O**
- It is an inert gas that does not react with metals or nonmetals. **Ar**
- It contains 1 more proton than an alkaline earth metal. **B**
- It is a metal that reacts vigorously with water. **Na**
- It has electrons located in 4 energy levels. **Ca**

Match each of these five elements with the appropriate characteristic. Write the chemical symbol of the element beside the corresponding characteristic.

5. Using the information below as well as the periodic table, give the chemical symbol of each of the four unknown elements.

Element	Number of valence electrons	Number of protons	Number of energy levels	Other characteristics
H	1		1	
Na	1	11		
Cl	7		3	
Li			2	Reacts vigorously with water

6. Potassium, K, and calcium, Ca, are located next to each other in the periodic table of elements.

These two elements belong to the same period, but not to the same family.

Explain why potassium and calcium belong to the same period, but not to the same family.

*Same period = same # of Energy levels.  
different families = different valence e<sup>-</sup>*

PRACTICE C:

1. Which element corresponds to each of the definitions below?
- The element has electrons in 2 energy levels and the outer level is full. *Ne*
  - The element has electrons in 3 energy levels and it has 2 valence electrons. *Mg*
  - The element has an atomic mass of 28 and its nucleus contains 14 neutrons. *Si*
  - The element reacts vigorously with water and the electric charge of its nucleus is +19. *K*

2. Which element of the second period has 5 valence shell electrons?
- a) N      b) B      c) O      d) C

3. How many layers of electrons does an element in the third period have?
- a) 3      b) 4      c) 1      d) 2

4. Which of the following is the electron configuration of an alkali metal?

- a) ● ) ) )      b) ● ) ) )      c) ● ) )       d) ● ) ) )  
           2e- 8e- 7e-            2e- 8e- 8e-            2e- 4e-            2e- 8e- 1e-

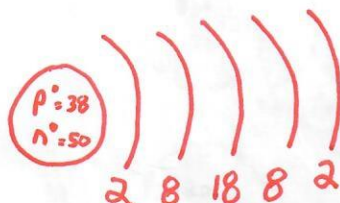
5. Which of the following represents the electron configuration of a halogen?

- a) ● ) ) )      b) ● ) ) )      c) ● ) )      d) ● ) ) )  
           2e- 8e- 7e-            2e- 8e- 8e-            2e- 4e-            2e- 8e- 1e-

6. Draw the electron configurations for the following:

**a) STRONTIUM**

Atomic Symbol: Sr  
 Period #: 5  
 # of shells: 5  
 Group #: 2A  
 Valence electrons: 2  
 Atomic Number: 38  
 Atomic Mass: 88  
 # of p<sup>+</sup>: 38  
 # of e<sup>-</sup>: 38  
 # of n<sup>0</sup>: 50



**b) TELLURIUM**

Atomic Symbol: Te  
 Period #: 5  
 # of shells: 5  
 Group #: 6A  
 Valence electrons: 6  
 Atomic Number: 52  
 Atomic Mass: 128  
 # of p<sup>+</sup>: 52  
 # of e<sup>-</sup>: 52  
 # of n<sup>0</sup>: 76

