

SHELL MODEL

NAME _____

SECTION _____

1. How many electrons, protons, and neutrons in the following atoms?

Atom	Nuclear Charge	Number of Protons	Number of Neutrons	Number of Electrons
H				
He				
Ne				

2. Describe the location of the proton, neutron, and electron in an atom such as hydrogen. How do the location of the proton, neutron, and electron differ for helium? For neon?

3. Excited atoms emit light energy. How is light energy produced?

4. How would we remove an electron from a hydrogen atom? How would we excite an electron in a hydrogen atom?

5. Write a chemical equation that describes the first ionization energy for:
- a hydrogen atom.
 - a helium atom.
 - a neon atom.
6. Below are the first ionization energies for elements $Z = 1$ to $Z = 19$.

Symbol	Z	IE (kJ mol ⁻¹)
H	1	1312
He	2	2372
Li	3	520
Be	4	899
B	5	801
C	6	1086
N	7	1402
O	8	1314
F	9	1681
Ne	10	2081

Symbol	Z	IE (kJ mol ⁻¹)
Na	11	496
Mg	12	738
Al	13	578
Si	14	786
P	15	1012
S	16	1000
Cl	17	1251
Ar	18	1520
K	19	419

What patterns do you see in the data above?

7. Diagram each of the following atoms using the shell model.
- hydrogen
 - helium
 - lithium
 - nitrogen
 - sodium
 - chlorine