**Text Questions: Q# 1-5, 7-9 pg. 40**

1. Atomic radius is the distance from the centre of atom to the boundary within which the electron spends 90% of their time. For elements that can be crystalized in their pure form, chemists use X-ray crystallography to measure the distance between the centres of atoms. Neutron and electron diffraction are sued to measure the distance between the centres of atoms for diatomic gas molecules.
2. Inc atomic radis: O < Sb < Sn < Ba < Cs
3. The atomic radius increases as you go down a group because you are adding energy levels.
4. A is sodium because the sodium atom will lose an electron to form the Na+ ion. When it forms the Na+ ion it will have lost an entire energy level and will get smaller. B is chlorine because Cl gains an electron to form the chloride ion (Cl-). The electron is added to the valence energy level. There is now an extra electron that the protons have to attract and they cannot do this as well. Therefore the size will get bigger.
5. Ionization energy is the energy required to remove the outermost electron from an atom or ion in the gas phase.

7. A + energy 🡪 A+ + e- (first ionization)
A+ + energy 🡪 A2+ + e- (second ionization)
A2+ + energy 🡪 A3+ e- (third ionization) - this is what the question asked for
This ionization energy would be larger than the ionization energy for the loss of the first or second electron because each time you remove more electrons there is still the same number of protons attracting them. Each electron will feel more of a pull and therefore it will require more energy to remove them.

8. Helium only has two electrons to lose, therefore it cannot have a third ionization energy.

9. Inc IE: Cs < Sr < As < P < F < He