1. (a) Which atom or ion in each of the following pairs has the larger radius?
   (i) V or Mo  
   (ii) V or Zn  
   (iii) Ca or Ca\(^{2+}\)
   (b) Briefly explain the relationship between effective nuclear charge and atomic radius.

2. Consider the KF molecule, which has an ionic bond. The bond length is \(2.17 \times 10^{-10}\) m.
   (a) Calculate the energy required to dissociate the KF molecule into the ions K\(^+\) and F\(^-\).
   (b) The energy required to dissociate KF into neutral atoms is 498 kJ/mol. Given that the first ionization energy for K is 418 kJ/mol, calculate the electron affinity (in kJ/mol) for F. Show your work for all calculations.

3. Draw an energy diagram (with energy on the y-axis and internuclear distance, \(r\), on the x-axis) plotting a C–F and a C–I bond. You should include numbers on the y-axis. No numbers are needed on the x-axis, but relative distances should be correct. Bond dissociation energies are 238 kJ/mol and 484 kJ/mol for C–I and C–F respectively.