CHEM 1101 B **MID-TERM TEST #1 FALL 2018** **calculators allowed**
75 minutes

- Print your name and student number on your test booklet. **UNDERLINE YOUR LAST NAME**
- SPACE OUT YOUR ANSWERS – we will mark answers on the lined side of the page only – you can use the other side for rough work if you wish
- **KEEP YOUR TEST PAPER - HAND IN ONLY THE BOOKLET**
- **TURN OFF YOUR CELL PHONES AND ANY ALARMS YOU MAY HAVE**

25% 1. Germanium has a work function of 449.5 kJ/mol.
   a) Calculate the wavelength of light that has just enough energy to eject electrons from the surface of solid germanium, in nm
   b) If light of wavelength 159 nm strikes a solid germanium surface, how much kinetic energy will each ejected electron have, in Joules?
   c) What will be the velocity of each electron, in m/s?

20% 2. For neodymium $_{60}$Nd:
   a) Give the electron configuration
   b) Identify the valence subshell(s). Give the orbital diagram and the quantum numbers for all electrons in the valence subshell(s)
   c) Identify the highest energy subshell. Give the orbital diagram and the quantum numbers for all electrons in the highest energy subshell, if different from b).
   d) Give the electron configuration for the neodymium(III) ion, Nd^{3+}.

15% 3. For the following elements: Al, Ar, Ca, He, K, Mg, Ne, Si
   a) Rank in order of **increasing** size
   b) Rank in order of **increasing** ionization energy

15% 4. Give the IUPAC (systematic) name for the following:
   a) NO_2 b) CaO c) MnO^{2+} d) Mn_2O_3

   Give the chemical formula for the following:
   e) tin sulfate f) tin sulfide g) ammonium carbonate

Turn over for question 5 and equations/P.T.