University of Portland Donald P. Shiley School of Engineering EGR 221 - Materials Science Exam 3 (CLOSED BOOK, CLOSED NOTES) November 25, 2013, Dr. K. Lulay

2015 – expect questions similar to the following for exam 4

- For lead-tin (Pb-Sn) alloy, answer the following questions. Use the space provided below to show all calculations and to answer the questions. For full credit, the phase diagram <u>MUST be clearly marked</u> to help communicate your answers where appropriate. Use a straight edge.
 - a) (20 pts) If the microstructure of a Pb-Sn alloy at 185°C is composed of 75wt% α and 25wt% liquid, approximately what is the overall composition of the alloy?
 - b) (10pts) For the same alloy discussed in part (a) above, if the alloy was cooled from 185° C to 180° C, what would the weight percentage be of primary α and of eutectic structure?
 - c) (10pts) For an alloy that is 90wt%Sn, 10wt%Pb, what phases are present at 200°C, and what are their compositions?
 - d) (5 pts) What is the temperature difference between melting point of pure tin (Sn) and a eutectic composition Pb-Sn alloy?

