Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
300 Level First Semester Examination – May/July 2017
SCT 341-2 Chemistry for Material Science

Uva Wellassa University

Exam Number .....

PART C

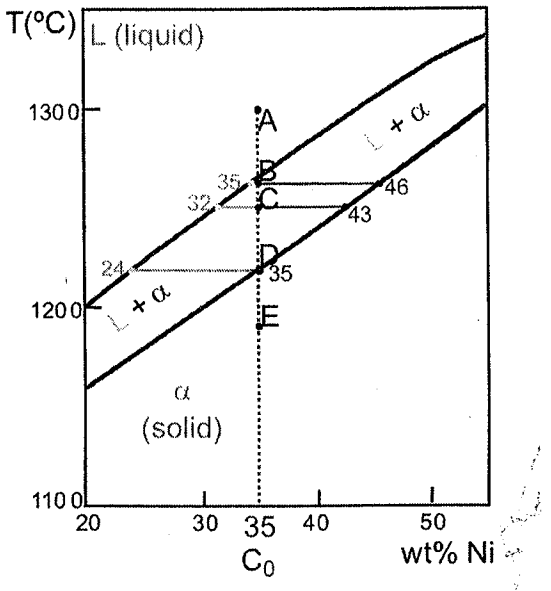
Answer in the booklet provided

1. Define following terms related to phase diagrams

(a) (i) Component
(ii) Phases
(iii) Solubility limit
(iv) Isomorphous system (10 marks)

(b) (i) Following is a part of Cu-Ni phase diagram. Calculate % liquid and % α phase present when 35% Ni is cooled from 1300-1200 °C. (A,B,C,D,E)

Cu-Ni system

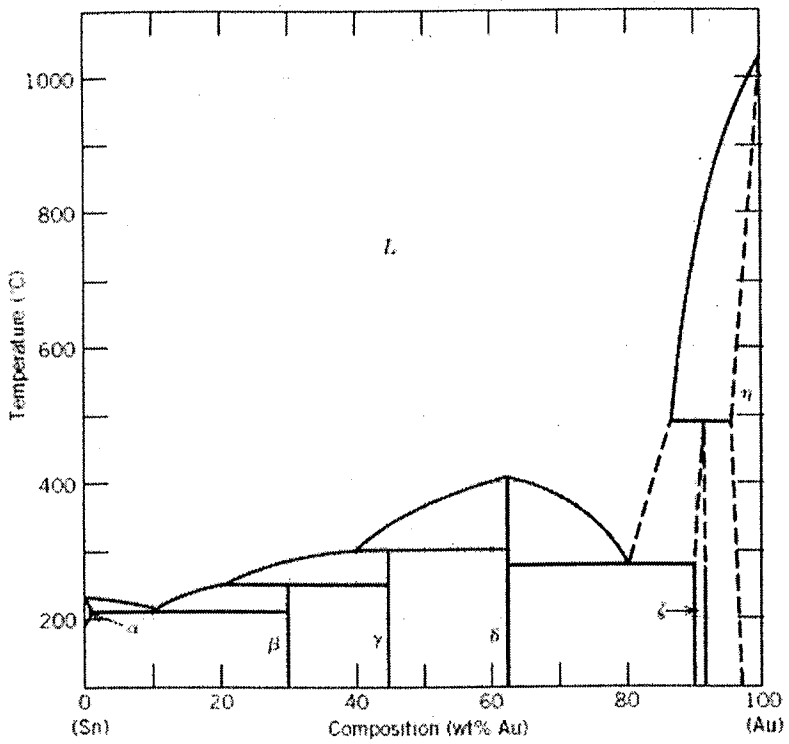


(ii) Compare fast cooling vs. equilibrium cooling of a liquid to solid related to chnages in morphology, diffusion rates of atoms, and composition changes. (10 marks)

(iii) Draw changes in the morphology when 35% Ni is FAST cooled from 1300-1200 °C. (A,B,C,D,E). Label regions with % of Ni (5 marks)

2. (a) Define following terms related to phase diagrams giving example for each kind.
(i) Eutectic (ii) Eutectoid (iii) Peritectic (6 marks)

(b) Following is the tin–gold phase diagram, for which only single-phase regions are labeled. Specify temperature–composition points at which all eutectics, eutectoids, and peritectics phase transformations occur. Also, for each, write the reaction upon cooling. You may mark each point as A,B,C... on the diagram and attach the question paper to the answer booklet. (6 marks)



(c) Compare homogeneous nucleation vs. heterogeneous nucleation (4 marks)

(d) (i) Give common names for following phases present in Fe-Fe_3C phase diagram.
(a) α phase (b) γ phase (c) Fe_3C (d) α + Fe_3C (4 marks)

(ii) Following is the isothermal phase transformation diagram for Fe-Fe_3C system when γ --> α + Fe_3C. Draw the morphological changes in microstructure of the alloy at A,B,C points. Also indicate % of α + Fe_3C phase in above A,B,C points. (5marks)