Mae 20-Final Exam (Chapters 9, 10, 11, 12, 13, 15, 17)

Question 1: Homework (also from 3/12 discussion session)
9.5, 9. 13, 9. 19, 9. 21
10.16, 10.19, 10.40, 11.7, 11.9
12.2, 13.10, 13.19, 13.45

Questions 2 and 3; Example from book
9.13, 2, 3, 4
10.4, 10.7, 10.8, 10.9
11.1, 11.2, 11.3, 11.4
12.1, 12.5, 12.7,

Questions 4 and 5: Derivation/Conceptual
Nucleation
Dendrite arm spacing
Chrovinov's rule
Monocrystalline turbine blades
Joining of metals
Gibbs phase rule
Hume –Rothery rules
Isomorphous phase diagrams and lever rule
Five principal three-phase reactions
Microstructures upon cooling in eutectic phase diagram
Formation of lamellae and interlamellar spacing
Nucleation and Avrami equations
TTT diagrams
Precipitation hardening and microstructures
Martensitic transformation
TTT diagrams and three different structures: pearlite, bainite, and martensite
Different techniques for processing of ceramics
Glasses: techniques for manufacturing
Rule of mixture in fiber-reinforced composites

Question 6: wild card