MATSE 259
Solutions to homework #8

1. Make a copy of the isothermal transformation diagram for an iron-carbon alloy of eutectoid composition (shown below) and then sketch and label on this diagram the time-temperature paths to produce the following microstructures:
   (a) 100% coarse pearlite.
   (b) 100% tempered martensite.
   (c) 50% coarse pearlite, 25% bainite, and 25% martensite.

   Below is shown an isothermal transformation diagram for a eutectoid iron-carbon alloy, with time-temperature paths that will produce (a) 100% coarse pearlite; (b) 100% tempered martensite; and (c) 50% coarse pearlite, 25% bainite, and 25% martensite.
2. The following figure shows the continuous cooling transformation diagram for a 1.13 wt% C iron-carbon alloy. Make a copy of this figure and then sketch and label continuous cooling curves to yield the following microstructures:

(a) Fine pearlite and proeutectoid cementite.
(b) Martensite.
(c) Martensite and proeutectoid cementite.
(d) Coarse pearlite and proeutectoid cementite.
(e) Martensite, fine pearlite, and proeutectoid cementite.

Below is shown a continuous cooling transformation diagram for a 1.13 wt% C iron-carbon alloy, with continuous cooling paths that will produce (a) fine pearlite and proeutectoid cementite; (b) martensite; (c) martensite and proeutectoid cementite; (d) coarse pearlite and proeutectoid cementite; and (e) martensite, fine pearlite, and proeutectoid cementite.