Assignment - III

1. **(a)** What is Zone refining? Explain by schematic diagrams and a very few sentences.

   (b) Show a eutectic binary phase diagram and mention different phases in it. Show Free energy vs composition diagram for three temperatures **(i)** just above eutectic point **(ii)** at eutectic point and **(iii)** just below eutectic point.

   [10+10]

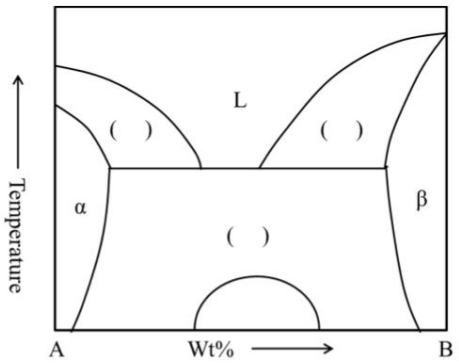
2. **(a)** Show in a neatly drawn diagram and explain the eutectoid transformation in Fe-Cementite phase diagram.

   (b) Show free energy-vs composition diagram at a temperature just above peritectic point in a peritectic transformation. **[10+10]**

3. **(a)** If three elements A, B and C forms binary isomorphous phase diagrams in all binary combinations, construct their ternary phase diagram.

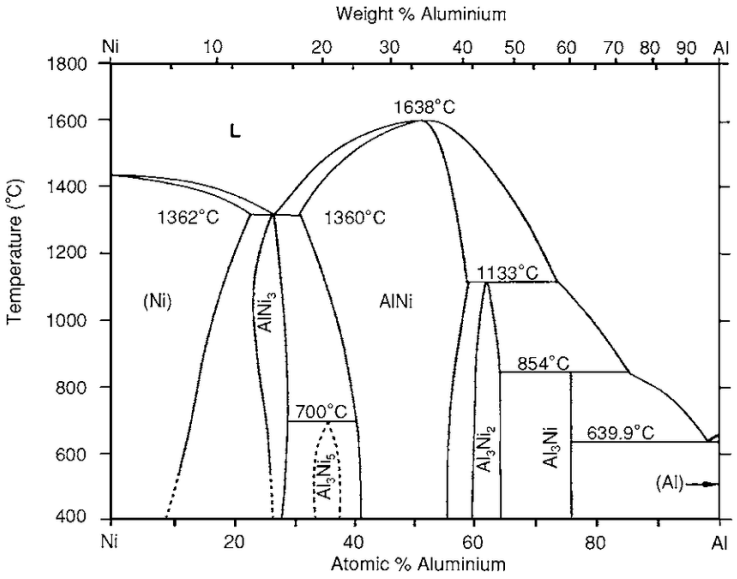
   (b) If A-B-C ternary system makes a ternary eutectic at A-25%B-25%C (At%), show the transformation in a ternary diagram. Show how you can transform the diagram into 2-D figure with the eutectic composition and binary liquidus tie lines. **[7+13]**

4. **(a)** Draw a neat sketch like the following phase diagram and list the errors in it.

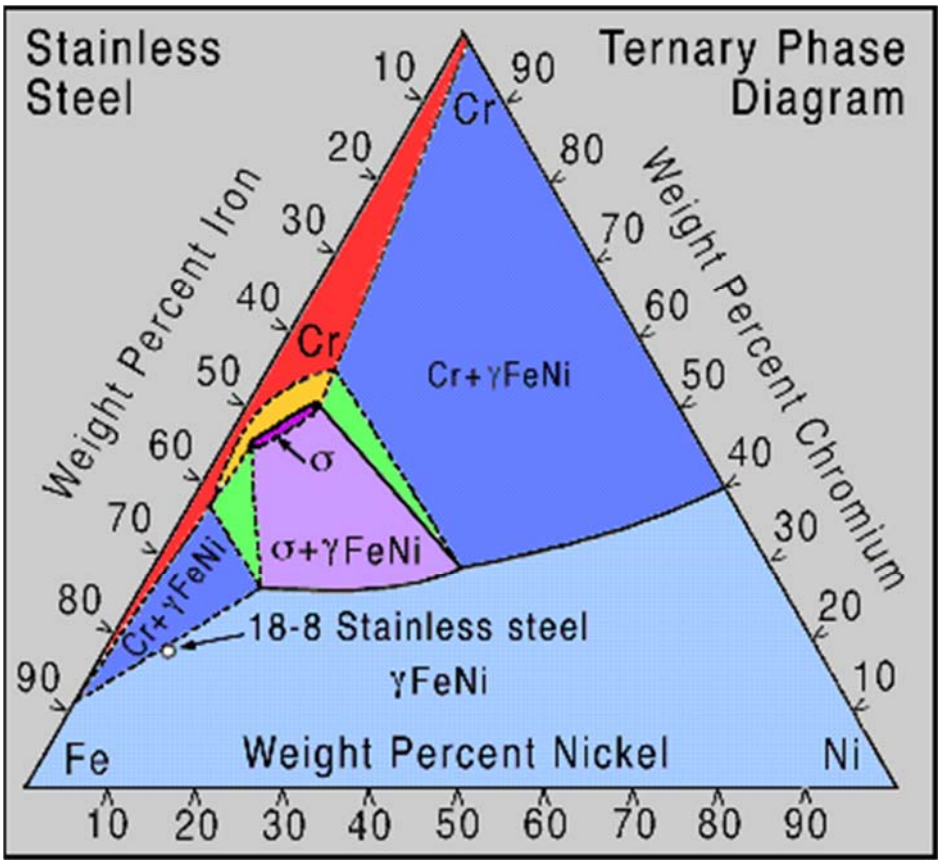


   (b) Construct a corrected phase diagram for Q4(a).

5. **(a)** Carefully examine the Ni-Al phase diagram given below. Explain why Ni-Al alloys are chosen as super alloys? Explain the line compound formation, intermetallic compound formation and the case(s) of congruent melting if any in the diagram.



(b) Examine the following ternary diagram. Write down the boundary compositions when the phase boundaries meet at a point of all different phases you can observe here.



[10+10]