**MATERIALS ENGINEERING**

 **DEPARTMENT OF INDUSTRIAL ENGINEERING**

**LIST OF PROBLEM STATEMENTS FOR PRESENTATIONS**

1. For 1 kg of 0.5wt% C steel, calculate the amount of :
2. proeutectoid phase
3. Pearlite phase
4. Total amount of cementite and ferrite
5. Eutectoid ferrite
6. Eutectoid cementite
7. For 1 kg of 3wt% C gray iron, calculate:
8. Locate the region and
9. calculate the corresponding phases at 1146˚C
10. Repeat this calculation for 725˚C
11. Repeat the calculation for room temperature
12. For 50:50 Pb-Sn solder, calculate:
13. Phase present
14. Composition of phases
15. Relative amounts, for 200˚C
16. Repeat all of the above for 100˚C
17. For 1kg of 2 wt% C steel, calculate:
18. proeutectoid phase
19. Pearlite phase
20. Total amount of cementite and ferrite
21. Eutectoid ferrite
22. Eutectoid cementite
23. For 40:60 Pb-Sn solder, calculate:
24. Phase present
25. Composition of phases
26. Relative amounts, for 200˚C
27. Repeat all of the above for 100˚C
28. A eutecoid plain-carbon steel is slowly cooled from 750˚C to a temperature just below 727˚C. Assuming that the Austenite is completely transformed to ɑ-ferrite and cementite, calculate:
29. Amount of eutectoid ferrite formed
30. Amount of eutectoid cementite formed
31. Amount of proeutectoid phase present
32. A 0.40wt% C plain-carbon steel is slowly cooled from 940˚C to a temperature just slightly above 727˚C, calculate:
33. Austenite phase present
34. Proeutectoid phase present
35. Eutectoid ferrite and eutectoid cementite present if it is cooled slightly below 727˚C
36. Plain carbon steel which was cooled from the austenitic region to a room temperature contains 9.1wt % eutectoid ferrite. Assuming no change in structure on cooling from just below the eutectoid temperature to room temperature,
37. What is the carbon content of steel?
38. Specify the region based on this carbon content.
39. Calculate total ferrite and proeutectoid phase.
40. A 0.9wt% C plain-carbon steel is slowly cooled from 960˚C to a temperature just slightly above 727˚C, calculate:
41. Austenite phase present
42. Proeutectoid phase present
43. Eutectoid ferrite and eutectoid cementite present if it is cooled slightly below 727˚C
44. For 60:40 Pb-Sn solder, calculate:
45. Phase present
46. Composition of phases
47. Relative amounts, for 200˚C
48. Repeat all of the above for 100˚C
49. Plain carbon steel which was cooled from the austenitic region to a room temperature contains 9.1wt % eutectoid ferrite. Assuming no change in structure on cooling from just below the eutectoid temperature to room temperature,
50. What is the carbon content of steel?
51. Specify the region based on this carbon content.
52. Calculate total ferrite and proeutectoid phase.
53. Calculate the amounts and compositions of phases and microconstituents, eutectoid feerite and cementite in a Fe-0.60 wt% C alloy:
54. at 720˚C.
55. at room temperature