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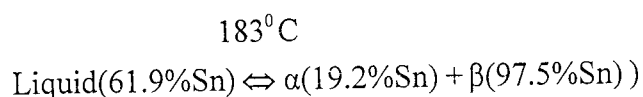Test II Series Examination
CH 2004 MATERIAL SCIENCE
Duration: 1 hour   Date: 07-04-15   Maximum Marks: [15]

Instructions: Briefly answer the following questions.

1. What is a phase? What is the difference between α-ferrite and Υ-ferrite   1

2. Define an invariant reaction with an example.   1

3. Differentiate between Solvus line and solidus line   1

4. a. Explain the lever rule.   1

   b. Find the weight of proeutectoid ferrite just above the eutectoid temperature for

   0.03% C steel.   1

5. In a lead-tin system, the following reaction takes place

$$183^0C$$
$$Liquid(61.9\%Sn) \Leftrightarrow \alpha(19.2\%Sn) + \beta(97.5\%Sn))$$

The melting point of lead and tin are 327°C and 232°C respectively.

   a. Draw the phase diagram   1

   b. Using lead, make a material balance for 600 g of 80 Pb-20Sn solder (write the phases present and composition) and calculate the amount of phases present.   2

6. Briefly describe the two stages involved in the formation of particles of a new phase.   2

7. Briefly describe the phenomena of superheating and supercoiling.   2

9. a. What are corrosion inhibitors?   1

   b. What possible mechanisms account for their effectiveness?   2