Uva Wellassa University, Sri Lanka
End Semester Examination – February 2011
SCT 442-2 Metallurgy

Time: Two (02) Hours

Total **04** Questions
Answer **three (03)** questions only

1.

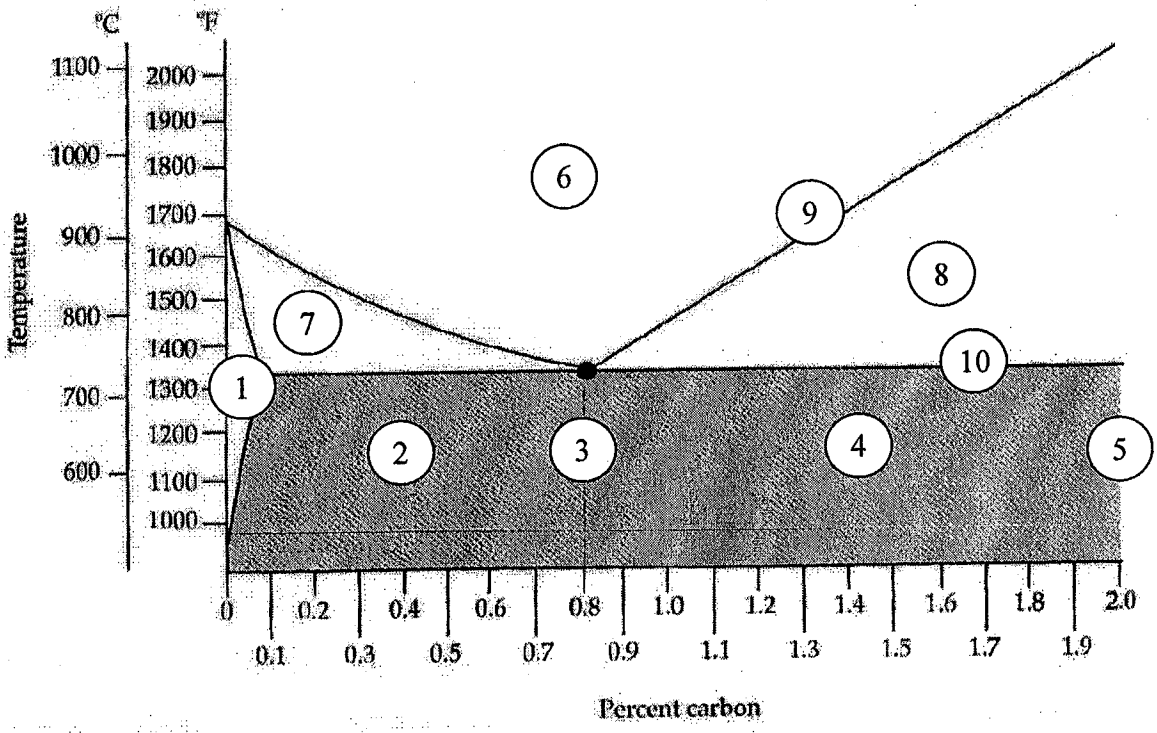

Fig Q1

a. Name the regions 1-10 in the Fig Q1.

b. Compare the structures and applications of the materials in regions 1, 3, 5 and 6.

c. What are the importance of lines 9 and 10?

d. What are the differences in material properties of the materials formed in regions 2 and 4?

e. If a material at region 6 is suddenly cooled to the region 4, what can you say about its structural and mechanical properties?

(100 marks)

2.

a. Compare process, mechanical properties and applications of quenching, annealing and normalizing (Use a table).

b. What are the four stages of quenching? Which stage determines the final hardness? Give reasons to your answer.

c. What are the different mediums we can use for quenching? Discuss about their applications.

d. How to determine the heating time inside the oven for quenching?

(100 marks)

3.

a. Discuss the following effects with reference to annealing and normalizing.

   i. Machinability

   ii. Internal stress relief

   iii. Formability

   iv. Refinement of crystal structures

b. Compare full annealing with process annealing. Use phase diagrams for the discussion.

c. Compare Martempering with Austempering. Use IT diagrams for the discussion.

d. Write a short note on cyaniding giving applications, advantages and disadvantages,

(100 marks)

4.

a. Write down the three main types of hardening methods used to increase the hardness of non-ferrous materials.

b. What are the similarities and dissimilarities of copper, bronze and brass?

c. Discuss the applications of tin.

d. What is the reason that gold and platinum are expensive compared to other metals?

(100 marks)