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Courses » Phase Diagrams in Materials Science and Engineering

Announcements Course Ask a Question Progress Mentor

## Unit 10 - Week 9

### Course outline

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Week 9

- Lecture 35 : TTT curves for Steel
- Lecture 36 : Cast Iron - I
- Lecture 37 : Cast Iron - II
- Lecture 38 : Ductile Iron & Nodular Iron
- Lecture 39 : Malleable Iron
- Quiz : Week 9 Assignment 9

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Assignment Solutions

### Week 9 Assignment 9

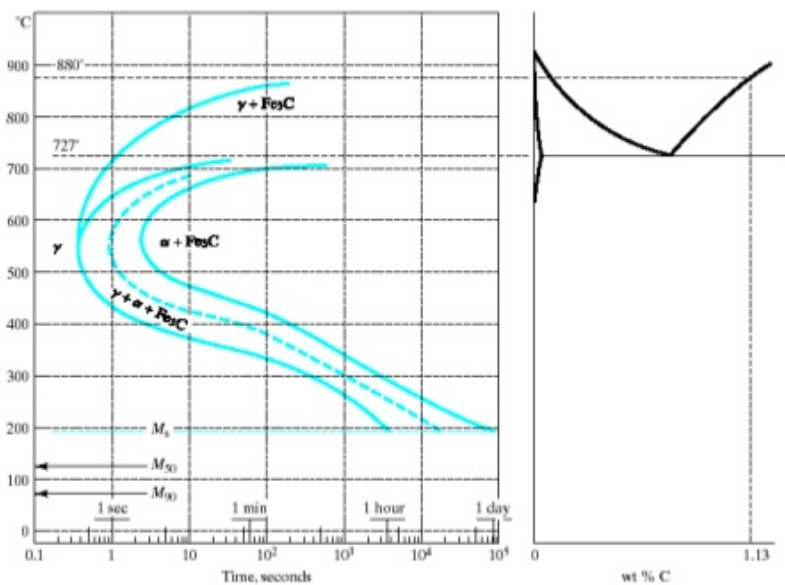
The due date for submitting this assignment has passed. **Due on 2016-03-22, 23:55 IST.**

#### Submitted assignment

1.1) A carbon steel with 1.13 wt % C is given the following heat treatment: **2 points**

instantaneously quenched to 200°C held for 1 day cooled slowly to room temperature. What is the resulting microstructure?

### TTT diagram for a hypereutectoid Steel (1.13 wt% C)



- 90% Bainite, 10% Martensite
- 90% Bainite, 10% Pearlite
- 100% Bainite
- None of these

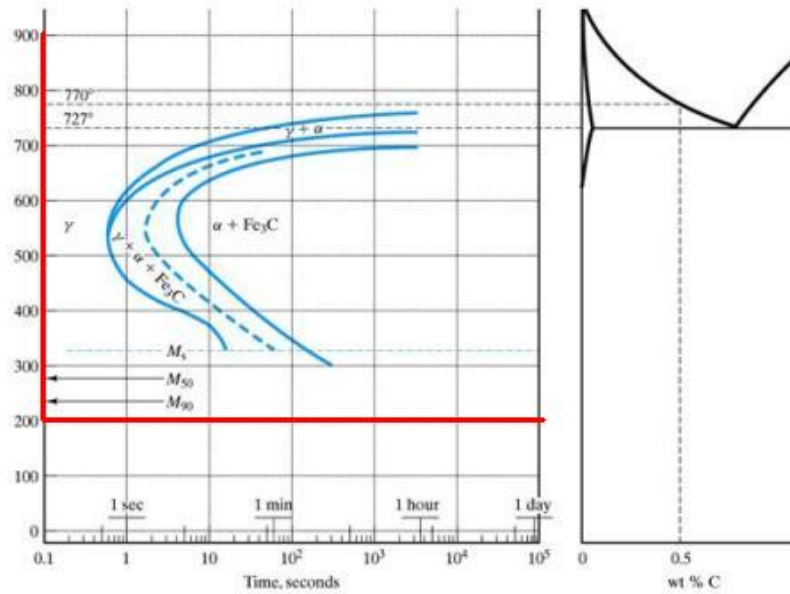
**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*100% Bainite*

1.2) What microstructure would result if a carbon steel with 0.5 wt % were given the exact same heat treatment as in question 1? **2 points**



*TTT diagram for a hypoeutectoid composition (0.5 wt % C)  
compared with the Fe-Fe<sub>3</sub>C phase diagram*

- 90% Martensite, 10% Fine Pearlite
- 90% Martensite, 10% Coarse Pearlite
- 100% Martensite
- 100% Bainite

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*90% Martensite, 10% Coarse Pearlite*

1.3) Three different eutectoid steels are given the following heat treatments: **2 points**

- A. Instantaneously quenched to 600°C, held for 2 minutes, cooled to room temperature.
- B. Instantaneously quenched to 400°C, held for 2 minutes, cooled to room temperature.
- C. Instantaneously quenched to 100°C, held for 2 minutes, cooled to room temperature.

List these heat treatments in order of decreasing hardness of the final product.

- A>C>B
- B>A>C
- C>B>A
- A>B>C

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*C>B>A*

4) Why is white cast iron not used for any application? **2 points**

- It is brittle due to presence of Fe<sub>3</sub>C
- It is difficult to manufacture
- It is very costly to produce and thus is not on a large scale
- None of these

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*It is brittle due to presence of Fe<sub>3</sub>C*

5) What does the matrix of grey iron contain?

2 points

- Pearlite
- Ferrite
- Either A or B
- None of these

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*Either A or B*

6) Why Mg-Ni alloy is added to Nodular cast iron?

2 points

- To increase its hardness
- To increase its toughness
- To decrease its melting point
- To increase its tensile ductility

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*To increase its tensile ductility*

7) How does martensite form ?

2 points

- By diffusionless transformation
- Through the help of various diffusion processes
- Can't Say

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*By diffusionless transformation*

8) Which type of cast iron will be formed if it as fast cooled?

2 points

- ferritic ductile cast iron
- ferritic grey cast iron
- pearlitic grey cast iron
- white cast iron

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*white cast iron*

9) What is the use of silicon in cast iron?

2 points

- to improve its mechanical properties
- to control the formation of graphite phase
- to improve its remarkable electrical properties
- None of these

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*to control the formation of graphite phase*

1.10) Which type of cast iron will be formed if a white cast iron is reheated to 850°C for 36 hr and then slowly cooled:

2 points

- White Cast iron
- ferritic malleable iron
- , pearlitic malleable iron
- None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

*ferritic malleable iron*

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