



Unit 8 - Week 7

Course outline

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Week 7

● Lecture 26 : Introduction to Iron-Carbon phase diagram

● Lecture 27 : Eutectoid transformation in Iron-Carbon phase diagram

● Lecture 28 : Austenite to pearlite transformation in Iron-Carbon phase diagram

● Lecture 29 : Hypo-eutectoid steels

○ Quiz : Week 7 Assignment 7

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Week 7 Assignment 7

The due date for submitting this assignment has passed. **Due on 2016-03-08, 23:55 IST.**

Submitted assignment

1) An alloy of Fe - 0.8 wt% C undergoes eutectoid reaction at 723⁰C to give pearlite by the following reaction $g \rightleftharpoons d + Fe_3C$, where g = austenite, d = delta iron and Fe_3C = cementite. 1 point

- True
- False
- Can't Say

No, the answer is incorrect.

Score: 0

Accepted Answers:

False

2) The mass fractions of total ferrite and total cementite in an iron-carbon alloy are 0.88 and 0.12, respectively. Which type of alloy is this? 3 points

- It is a hypo-eutectoid alloy
- It is a hyper-eutectoid alloy
- It is a eutectoid alloy
- None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

It is a hyper-eutectoid alloy

3) Which of the following is a correct description of pearlite. 1 point

- It is a mixture of two phases: α ferrite and Fe_3C
- It is a separate phase different from α ferrite and Fe_3C
- It is a mixture of two phases: α ferrite and γ austenite
- None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

It is a mixture of two phases: α ferrite and Fe_3C

4) Medium carbon steels contain C in the range _____ . 1 point

- 1.3 to 1.9 wt% C

Week 13

Assignment Solutions

- 0.8 to 1.3 wt% C
- 0.1 to 0.3 wt% C
- 0.3 to 0.8 wt% C

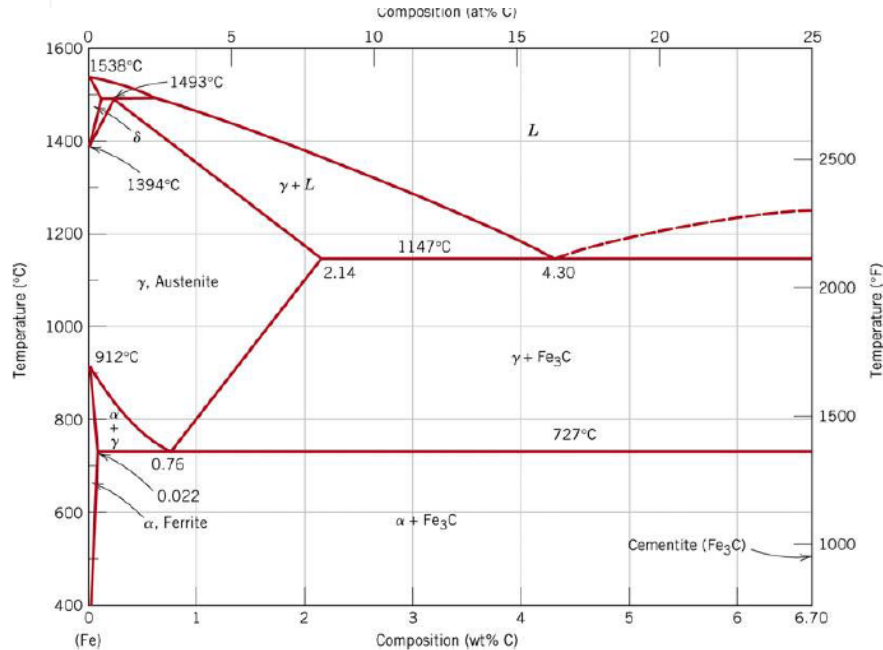
No, the answer is incorrect.

Score: 0

Accepted Answers:

0.3 to 0.8 wt% C

5) Consider 1.0 kg of austenite containing 1.15 wt% C, cooled to below 727°C. What is the proeutectoid phase? Phase diagram is given below. 2 points



- α Ferrite phase
- γ Austenite phase
- Fe_3C phase
- None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

Fe_3C phase

6) In Question 5, how many kilograms each of total ferrite? 2 points

- 0.77 kg
- 0.88 kg
- 0.71 kg
- 0.83 kg

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.83 kg

7) In Question 5, how many kilograms each of pearlite and the proeutectoid phase form? 2 points

- 0.93 kg pearlite and 0.07 kg proeutectoid phase
- 0.90 kg pearlite and 0.10 kg proeutectoid phase
- 0.95 kg pearlite and 0.05 kg proeutectoid phase
- 0.87 kg pearlite and 0.13 kg proeutectoid phase

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.93 kg pearlite and 0.07 kg proeutectoid phase

8) Ratio of thickness of ferrite to cementite is roughly _____ assuming densities to be equal. **1 point**

- 5:1
- 5.5:1
- 7:1
- 8:1

No, the answer is incorrect.

Score: 0

Accepted Answers:

8:1

1.9) A steel sample has slowly been cooled from austenite region to room temperature. The **3 points** microstructural analysis shows that the steel contains 60 volume % ferrite and 40 volume% pearlite. Determine the carbon concentration of the steel.

- 34 wt% C
- 25 wt% C
- 31 wt% C
- 29 wt% C

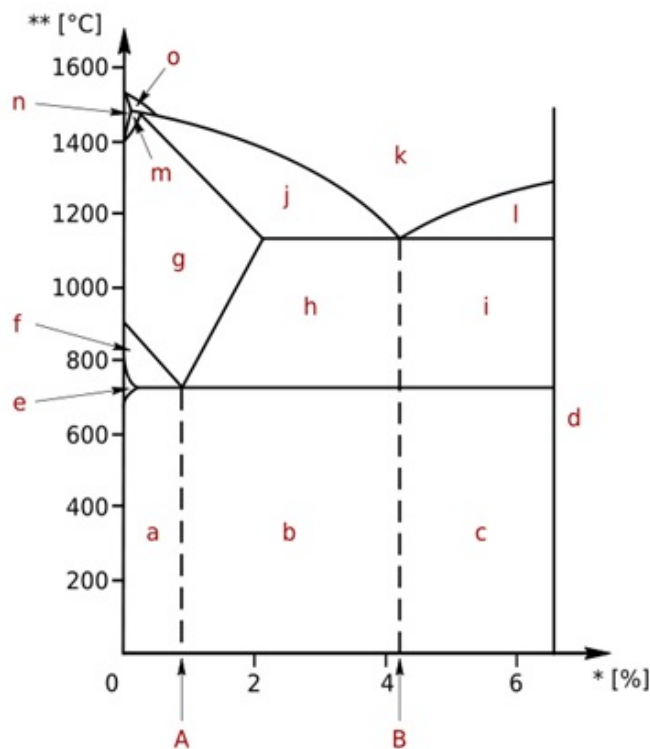
No, the answer is incorrect.

Score: 0

Accepted Answers:

31 wt% C

1.10) Given below is the Fe-C phase diagram. Point A = 0.8 wt% C, B = 4.2 wt% C, E = 6.67 wt% C, F = 0.02 wt% C and G = 5 wt% C. If D = 1.2 wt% C, determine phases present and their volume % at 800°C. **1 point**



- α phase
- γ phase
- Fe_3C phase

None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

γ phase

Fe_3C phase

11) In Question 10, what kind reaction occurs at point 'p'? Write down the reaction on cooling. (P is the point at the intersection of M, N and O phases) **1 point**

Peritectic reaction

$\alpha + L \rightarrow \gamma$

Eutectoid reaction

$\gamma \rightarrow \alpha + Fe_3C$

Eutectic reaction

$L \rightarrow \gamma + Fe_3C$

None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

Peritectic reaction

$\alpha + L \rightarrow \gamma$

12) In question 10, consider an alloy composition G. Calculate the volume% of phases present just above eutectoid transformation temperature. **2 points**

28.9 wt% Fe_3C

28.9 wt% γ

71.1 wt% γ

71.1 wt% Fe_3C

No, the answer is incorrect.

Score: 0

Accepted Answers:

28.9 wt% γ

71.1 wt% Fe_3C

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