Unit 13 - Week 11

Assignment 11

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-12-02, 23:59 IST.

1) The melting point of Copper is 1085°C and if it homogeneously nucleates at 850°C with a latent heat of fusion equal to $-1.5 \times 10^9 J/m^3$ and surface energy being $0.15 J/m^2$, the critical radius (rounded off to one decimal place) is _____ nm.

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 1.1,1.2

2 points

2) For the solidification of iron, the latent heat of fusion and surface energy are $-1.85 \times 10^9 J/m^3$ and $0.204 J/m^2$, respectively. The homogeneous nucleation starts at a super cooling value of 350°C Assuming the lattice parameter of 0.292 nm for solid iron at its melting temperature of 1538°C, the number of atoms found in the nucleus of critical size is _____

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 490,510

5 points

3) The kinetics of phase transformation from austenite to pearlite obey Avrami type relationship. The fraction transformed-time data is given below.

Fraction transformed	Time (s)
0.1	12.0
0.7	28.0

The time required for 95% of the austenite to transform to pearlite in seconds (rounded off to one decimal place) is _____

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 37.5,39.5

5 points

Figure 1 shows the T-T-T diagram for a plain carbon eutectoid steel alloy.

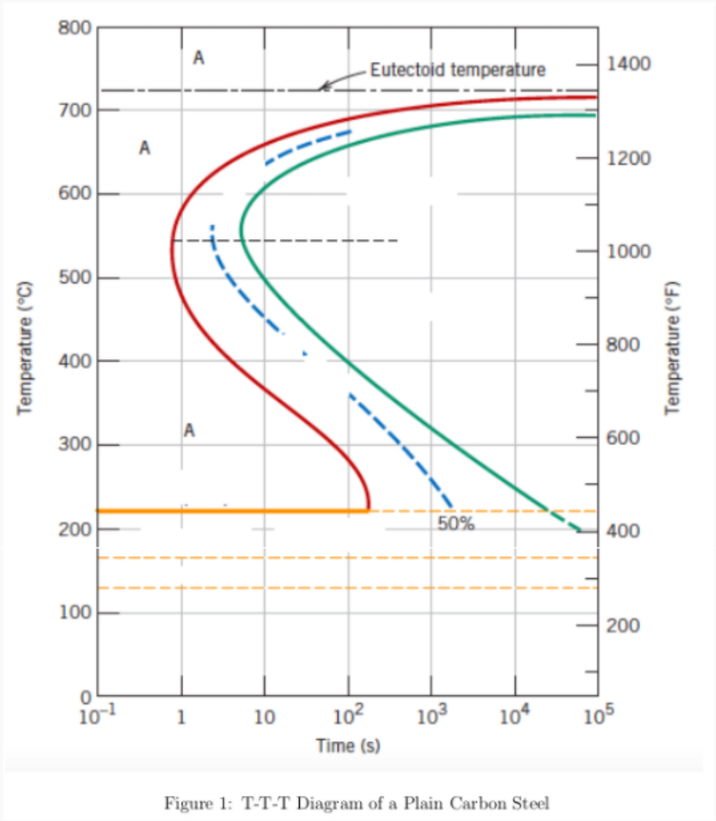

Figure 1: T-T-T Diagram of a Plain Carbon Steel

4) If the steel is suddenly cooled from 900°C to 600°C and held there for 100 seconds, the resulting microstructure will be ***1 point***

- 100% Coarse Pearlite
- Proeutectoid Cementite + Fine Pearlite
- Proeutectoid Ferrite + Fine Pearlite
- Proeutectoid Ferrite + Coarse Pearlite

No, the answer is incorrect.
Score: 0
Accepted Answers:
100% Coarse Pearlite

5) If the steel is suddenly cooled from 900°C down to 700°C and held there for 10 seconds and then suddenly cooled to 500°C and held there for 10 seconds followed by sudden cooling to room temperature, the resulting microstructure will be ***1 point***

- 100% Fine Pearlite
- 100% Bainite
- 50% Austenite and 50% Pearlite
- 50% Austenite and 50% Martensite

No, the answer is incorrect.
Score: 0
Accepted Answers:
100% Bainite

6) The resulting microstructure when the steel is cooled suddenly from 900°C to 450°C and held there for 10 seconds followed by sudden cooling to room temperature is ***1 point***

- 50% Pearlite + 50% Bainite
- 50% Pearlite + 50% Martensite
- 50% Bainite + 50% Martensite
- 50% Retained Austenite + 50% Martensite

No, the answer is incorrect.
Score: 0
Accepted Answers:
50% Bainite + 50% Martensite