Assignment 11

The due date for submitting this assignment is February 23, 2020.

As per our records, you have not submitted this assignment.

1) The melting point of Copper is 1085°C and if it homogeneously nucleates at 885°C with a latent heat of fusion equal to $-1.3 \times 10^3$ J/kg and surface energy being $0.35 \times 10^2$ J/m², the critical radius (rounded off to one decimal place) is ______ mm.

No, the answer is incorrect.
Score: 2 points
Accepted Answer: 1.1
(Range: 1.04, 1.1)

2) For the solidification of iron, the latent heat of fusion and surface energy are $1.74 \times 10^3$ J/kg and $4.6 \times 10^2$ J/m², respectively. The homogenous nucleation starts at a supercooling value of 230°C. Assuming the surface tension of iron at melting temperature of 1538°C, the number of atoms found in the nucleus of critical size is ______

No, the answer is incorrect.
Score: 5 points
Accepted Answer: 440.4
(Range: 440.0, 440.8)

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

<table>
<thead>
<tr>
<th>Fraction transformed (%)</th>
<th>Time (s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1</td>
<td>12.0</td>
</tr>
<tr>
<td>0.7</td>
<td>28.0</td>
</tr>
</tbody>
</table>

The time required for 50% of the austenite to transform to pearlite in seconds (rounded off to one decimal place) is ______

No, the answer is incorrect.
Score: 5 points
Accepted Answer: 20
(Range: 19.5, 20.5)

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

![T-T-T Diagram of a Plain Carbon Steel](image)

4) If the steel is suddenly cooled from 600°C to 0°C and held there for 100 seconds, the resulting microstructure will be ______

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

No, the answer is incorrect.
Score: 1 point
Accepted Answer: 100% Coarse Pearlite

5) If the steel is suddenly cooled from 600°C down to 700°C and held there for 10 seconds and then suddenly cooled to 10°C and held there for 100 seconds followed by sudden cooling to room temperature, the resulting microstructure will be ______

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

No, the answer is incorrect.
Score: 1 point
Accepted Answer: 100% Fine Pearlite

6) The resulting microstructure when the steel is cooled suddenly from 500°C to -50°C and held there for 10 seconds followed by sudden cooling to room temperature is ______

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

No, the answer is incorrect.
Score: 1 point
Accepted Answer: 50% Pearlite + 50% Bainite