

MSE 426
Heat Treatment of Materials
(2024-2025 Springer)
 Assignment 4

1- Choose the correct statement

- ☐ Ferrite (α) phase is a solid solution and it is formed by carbon dissolution in BCC crystal of iron
- ☐ Austenite (γ) phase is a solid solution and it is formed by carbon dissolution in FCC crystal of iron
- ☐ Martensite is a kind of super saturated solid solution which has body centered tetragonal crystal structure
- ☐ Pearlite and bainite are the phase mixtures containing ferrite and cementite phases
- ☐ all of them

2- Choose the odd one out

- ☐ First step in heat treatment of steel is austenitization (γ_{tn})
- ☐ Annealing is the heat treatment in which the steel is slowly cooled after austenitization
- ☐ Normalizing is the heat treatment in which the steel is cooled in air
- ☐ Correct austenitization temperature is the temperature at which first austenite forms
- ☐ Quenching can be done by dropping of steel in water or oil after austenitization

3- Which one of the followings is true about mechanical properties of phases seen in steels

- ☐ ferrite is soft and ductile
- ☐ austenite has high toughness
- ☐ both martensite and cementite phases are hard and brittle
- ☐ hardness of an annealed steel changes with the relative amounts of ferrite and cementite phases
- ☐ none of them

4- Which one of the following heat treatment would you prefer to get highest hardness from a eutectoid steel?

- ☐ Austenitization at 780°C followed by water quenching
- ☐ Austenitization at 728°C followed by air cooling
- ☐ Austenitization at 780°C followed by annealing
- ☐ Austenitization at 780°C followed by water quenching and then heating at 250°C for 2h
- ☐ Do nothing

5- In eutectoid reaction, austenite transforms into ferrite and cementite.....T F

6- In hypoeutectoid steels, carbon content is higher than 0.76 wt.% carbon.....T F