

## CHAPTER 5

### Heat Treatment

#### Review Questions

1. Heat treatment is the controlled heating and cooling of metals for the purpose of altering their properties. Its importance as a manufacturing process stems from the extent to which properties can be altered.
2. Heat treatment changes material structure at the microscopic level and so can change both physical and mechanical properties.
3. While the term "heat treatment" applies only to processes where the heating and cooling are done for the specific purpose of altering properties, heating and cooling often occur as incidental phases of other manufacturing processes, such as hot forming and welding. Material properties will be altered as the material responds in the same way it would if an intentional heat treatment had been performed. Properties can be significantly altered by the heating and cooling.
4. Processing heat treatments are slow cool, rather long time, treatments designed to prepare a material for fabrication. Some possible goals of these treatments are: improve machining characteristics, reduce forming forces, or restore ductility for further fabrication .

5. Since most processing heat treatments involve rather slow cooling or extended time at elevated temperature, the conditions tend to approximate equilibrium, and equilibrium phase diagrams can be used as a tool to understand and determine process details .