

## Assessment Performance Criteria

### Chapter 5 – Polymers and Composites

Students will be able to:

- 5.1 differentiate polymers from other classes of engineering materials based on their macromolecular nature.
- 5.2 define and differentiate between the various types of secondary bonding
- 5.3 cite by what order of magnitude primary bonds are stronger than secondary bonds.
- 5.4 describe the role of primary and secondary bonding in polymeric solids and how secondary intermolecular bonding accounts for the relatively low melting temperature of most polymers.
- 5.5 list the major properties of polymers which make them both attractive and unattractive relative to other engineering materials for particular applications.
- 5.6 distinguish between a thermoplastic polymer, a thermoset polymer, and a rubber.
- 5.7 sketch the monomer unit for poly(ethylene)
- 5.8 relate molecular weight and degree of polymerization of a given polymer
- 5.9 define an amorphous polymer solid by its viscosity and glass transition temperature.
- 5.10 differentiate between an amorphous, a semicrystalline, and a crystalline polymer
- 5.11 describe the major methods of melt-processing polymeric materials
- 5.12 describe why epoxies and other thermosetting polymers are formed using two or more components which must be mixed.
- 5.13 describe the nature of crosslinking in a rubber and the origin of rubber elasticity
- 5.14 define what is meant by the term composite material
- 5.15 differentiate between a polymer-matrix, a metal-matrix, and a ceramic-matrix polymer
- 5.16 describe the attractive and unattractive reasons for creating composite materials.