1. Suggest a material for each of the following applications; provide your main reason for that choice.

   Beverage container   Flag Pole
   Floor Covering       Hockey Stick
   Bicycle frame        Fence

Choose one of these applications and provide a more in-depth discussion of your selection including, but not limited to – performance, safety, environmental, and cost.

2. Calculate the composition and quantity of all phases for a 50 wt % Magnesium - Lead alloy at 435°C. Sketch the resulting microstructure, assuming the material was equilibrium cooled from the liquid phase.

3. Explain how precipitation hardening alters the properties of a material. Be sure to discuss the microscopic and macroscopic effects on strength, hardness, and ductility. When would you expect time in service to be an important factor?

4. A cylindrical specimen of a brass alloy 10 mm in diameter and 120 mm long is pulled in tension with a force of 11,750 N and then the force is released. Compute the final length of the specimen after this treatment. How would this number change if the force is increased to 24,000 N? [Hint – see figure 6-12]
Presentations: 5 points each (30 points total)

A. Another name for fool’s gold: _________________

B. Name the materials used as the matrix phase and dispersed phase in fiberglass:

C. Recall the discussion on light emitting diodes, **number** these colors in longevity order (i.e. the longest lasting diode color is first). **Cross out** the colors that cannot be created with current LED technology.

   White    Red    Orange    Yellow    Green    Blue    Black

D. Which of the following woods were mentioned as being used in hockey sticks
   Hornbeam    Balsa
   Bamboo    Ironwood
   Rock Elm    White Oak
   Slippery Elm    Mic Mac

E. Which of the following are real metal alloys (Circle the real ones)

   Red Brass    Invar    Cost Cutting Brass
   White Brass    Super Invar    Steel Alloy A36
   Blue Brass    Super Duper Invar    Aluminum Alloy 7075-T6
   Space Titanium    Invar Deluxe II    1020 plain carbon steel
   Niconel    Tarantulum    Ti-6Al-4V

F. Recall the talks concerning Teflon. Answer one of the following questions for full credit:

   Who is credited with discovering Teflon? ________
   When was it discovered (year)? ________
   What company? ________