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| 10-26)  A compression spring is needed to fit over a **0.5-in diameter rod**. To **allow** for some clearance, the **inside diameter of the spring is to be 0.6** **in**. To ensure a reasonable coil, use a **spring index of 10**. The spring is to be used in a machine by compressing it from a **free length of 5 in** through a **stroke of 3 in** to its solid length. The spring should have **squared and ground ends**, unpeened, and is to be made from **HOT-drawn wire**.   * 1. (*a*)  Determine a suitable wire diameter.   2. (*b*)  Determine a suitable total number of coils.   3. (*c*)  Determine the spring constant.   4. (*d*)  Determine the static factor of safety when compressed to solid length.   5. (*e*)  Determine the fatigue factor of safety when repeatedly cycled from free length to solid   length. Use the Gerber-Zimmerli fatigue-failure criterion. |  |

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| 10-36)  The extension spring shown in the figure has full-twisted loop ends. The material is **AISI 1065 OQ&T wire**. The spring has **84 coils** and is close-wound with a **preload of 16 lbf.** (*a*) Find the **closed length** of the spring. (*b*) Find **the torsional stress** in the spring corresponding to the preload.  (*c*) Estimate the **spring rate**. (*d*) What load would cause **permanent deformation**? (*e*) What is the **spring deflection** corresponding to the load found in part *d*? |  |