ME 301: HW Assignment 6 – 50 points

1. A brass wire is cold-drawn 25 percent to a diameter of 1.10 mm. It is then further cold-drawn to 0.900 mm. What is the total percent cold reduction? **[10]**

2. The following engineering stress-strain data were obtained for a 0.2% C plain-carbon steel. (*a*) Plot the engineering stress-strain curve. (*b*) Determine the ultimate tensile strength of the alloy. (*c*) Determine the percent elongation at fracture. **[6+2+2 = 10]**

Engineering Stress (in./in.)	**Engineering stress (ksi)**	**Engineering strain (ksi)**	**Engineering strain (in. /in.)**
0	0	76	0.08
30	0.001	75	0.10
55	0.002	73	0.12
60	0.005	69	0.14
68	0.01	65	0.16
72	0.02	56	0.18
74	0.04	51	(Fracture) 0.19
75	0.06		

3. A tensile specimen of cartridge brass sheet has a cross section of 0.320 in. × 0.120 in. and a gage length of 2.00 in. Calculate the engineering strain that occurred during a test if the distance between gage markings is 2.35 in. after the test. **[10]**

4. Twenty-cm-long rod with a diameter of 0.250 cm is loaded with a 5000 N weight. If the diameter decreases to 0.210 cm, determine (*a*) the engineering stress and strain at this load and (*b*) the true stress and strain at this load. **[5+5 = 10]**

5. Determine the tensile stress that must be applied to the $[1\bar{1}0]$ axis of a high-purity copper single crystal to cause slip on the $(\bar{1}\bar{1}1)$ $[0\bar{1}1]$ system. The resolved shear stress for the crystal is 0.85 MPa. **[10]**