明志科技大學 105 學年度研究所碩士班一般考試暨在職專班招生命題用紙

所別：材料工程研究所 組別：＿＿＿＿＿＿＿＿ 科目：材料科學導論

注意：□不准□一般計算器■工程用計算器，考試時間總計：100 分鐘。試題共 2 頁，第 1 頁

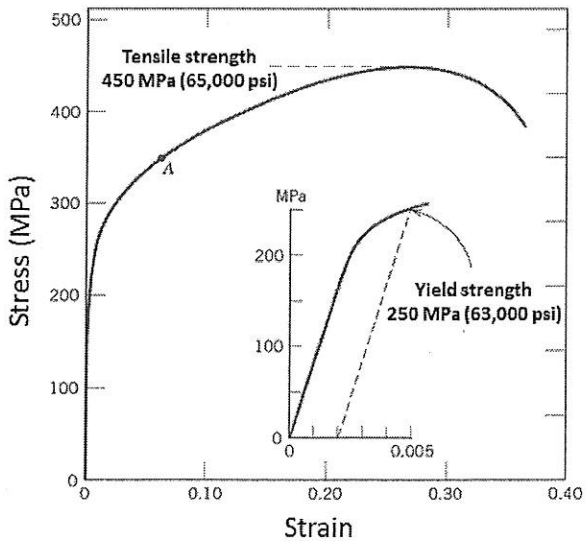
1. What is the coordination number of the FCC and HCP crystal structure? Please draw a picture to explain your answer。(10%)

2. What's the difference between the FCC and HCP crystal structure? Please draw a picture to explain your answer。(10%)

3. What is the coordination number (CN) for NaCl, CsCl, and ZnS structures。 Please draw a picture to explain your answer。(15%)

4. Give an equation to explain,
   (a) Eutectic reaction,
   (b) Eutectoid reaction,
   (c) Peritectic reaction。(15 %)

5. From the tensile stress–strain behavior for the brass specimen shown in below figure, determine the following:
   (a) The modulus of elasticity。(5%)
   (b) The yield strength at a strain offset of 0.002。(5%)
   (c) The maximum load that can be sustained by a cylindrical specimen having an original diameter of 12.8 mm (0.505 in.)。(5%)
   (d) The change in length of a specimen originally 250 mm (10 in.) long that is subjected to a tensile stress of 345 MPa (50,000 psi)。(5%)



背面尚有試題

6. The diffusion coefficients for copper in aluminum at 500 °C and 600 °C are 4.8×10^{-14} and 5.3×10^{-13} m^2/s, respectively. Determine the approximate time at 500 °C that will produce the same diffusion result (in terms of concentration of Cu at some specific point in Al) as a 10-h heat treatment at 600°C。(15%)

7. For intrinsic gallium arsenide, the room-temperature electrical conductivity is 10^{-6} $(\Omega\text{-m})^{-1}$; the electron and hole mobilities are, respectively, 0.85 and 0.04 $m^2/V\text{-s}$。Compute the intrinsic carrier concentration n_i at room temperature。(15%)