

# 國立彰化師範大學 97 學年度碩士班招生考試試題

系所：顯示技術研究所碩士班

科目：材料學

☆☆請在答案紙上作答☆☆

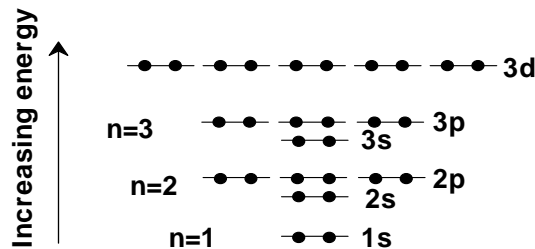
共 2 頁，第 1 頁

1. Explain the following terms. (15%)

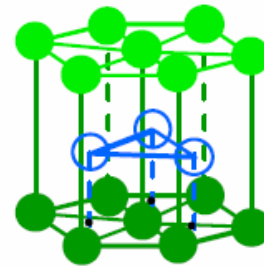
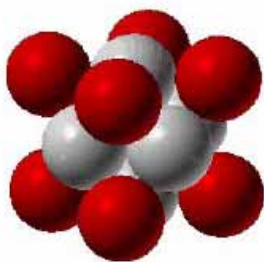
(a) Burgers vector      (b) Dislocation      (c) Yielding strength

2. For a steel alloy it has been determined that a carburizing heat treatment of 15 h duration will raise the carbon concentration to 0.35 wt% at a point 2.0 mm from the surface. Estimate the time necessary to achieve the same concentration at a 6.0 mm position for an identical steel and at the same carburizing temperature. (hint:  $x \propto (Dt)^{0.5}$ ) (15%)

3. Give the electron configuration for the following ions:  $P^{5+}$ , and  $I^-$ . The atomic number of P, Cu, and I are 15 and 53. (10%)

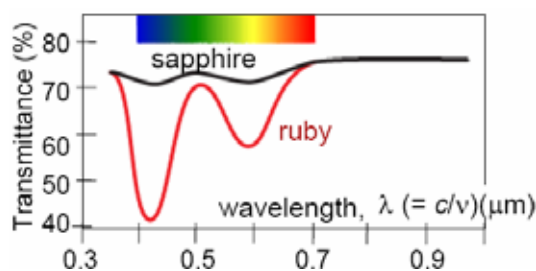


4. Determine the crystal structure (BCC, FCC, HCP) in Figure below. (15%)



Adapted from Fig. 3.3, Callister 6e.

5. What is the minimum wavelength absorbed by Cadmium Sulfide, CdS ( $E_g = 2.4 \text{ eV}$ )? (hint:  $h = 6.63 \times 10^{-34} \text{ J-s}$ ;  $c = 3 \times 10^8 \text{ m/s}$ ) (15%)



# 國立彰化師範大學 97 學年度碩士班招生考試試題

系所：顯示技術研究所碩士班

科目：材料學

☆☆請在答案紙上作答☆☆

共 2 頁，第 2 頁

6. Compare the magnitude of melting temperature, elastic modulus, coefficient of thermal expansion from ceramic( Ionic & Covalent), metal(Metallic), and polymer(Covalent & Secondary). (15%)

Properties Materials	Melting temperature	Elastic modulus	Coefficient of thermal expansion
Ceramic( Ionic & Covalent)			
Metal(Metallic)			
Polymer(Covalent & Secondary)			

*Note : cite the answer with High / Mid / Low*

☆☆請在答案紙上製表作答☆☆

7. Compare the difference between conductor, semiconductor, and insulator from band gap concept.(15%)

