

## 95 年度轉學考材料科學試題

1. (a) What is model for the Bohr atom? (b) Is the model correct? What is the problem of the model? (c) Compare Bohr with wave-mechanical atom model. 10 %

2. Show that the atomic packing factor for the face-centered cubic (FCC) crystal is 0.74. 10%

3. Describe the difference between edge dislocation and screw dislocation. 10%

4. The diffusion coefficients for carbon in nickel are given at two temperatures

| T (°C) | D (m <sup>2</sup> /s) |
|--------|-----------------------|
| 600    | $5.5 \times 10^{-14}$ |
| 700    | $3.9 \times 10^{-13}$ |

- (a) Determine the values of  $D_0$  and the activation energy  $Q_d$ .  
 (b) What is the magnitude of D at 850°C?  
 (Gas constant R is 8.31J/mol-K) 10 %
5. Describe the difference between ductile and brittle materials by the plot of tensile stress-versus strain. 10%
6. Describe the difference between thermal setting polymers and thermal plastic polymers and give an example for each kind of them. 10%
7. Describe the difference between eutectic reaction and eutectoid reaction and give an example for each kind of them. 10%
8. Describe the difference between intrinsic semiconductor and extrinsic semiconductors and give an example for each kind of them. 10%
9. Describe the difference between hard magnetic material and soft magnetic material and give an example for each kind of them. 10%
10. Briefly explain why some transparent materials appear colored while others are colorless. 10%