

# 大同大學 106 學年度 (暑)轉學入學考試試題

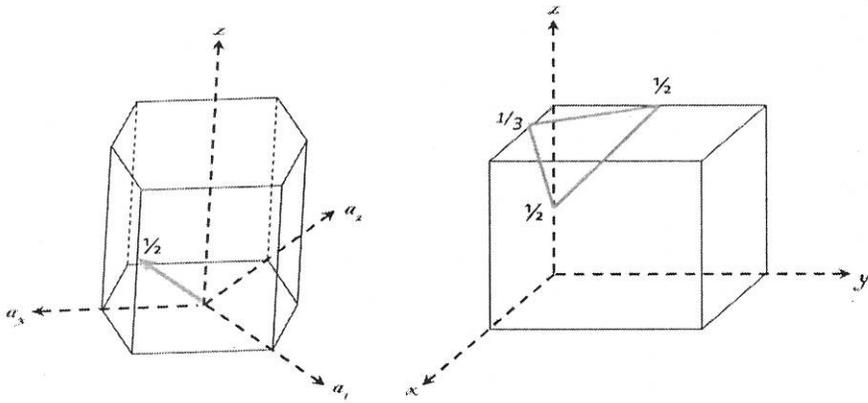
考試科目:材料導論

系別:材料工程學系

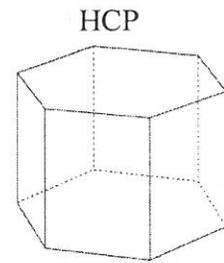
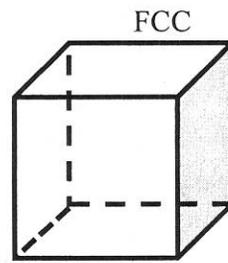
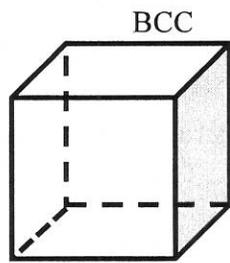
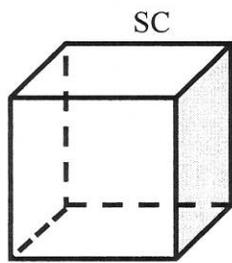
第 $\frac{1}{2}$ 頁

註:本次考試 不可以參考自己的書籍及筆記; 不可以使用字典; 不可以使用計算器。

1. Determine the indices for the directions and plane shown in the following unit cell: (2\*2%)



2. Identify and Draw the crystal structure: Simple Cubic (SC), Body-Centered Cubic (BCC), Face-Centered Cubic (FCC), Hexagonal Close-Packed (HCP). (3%\*4)

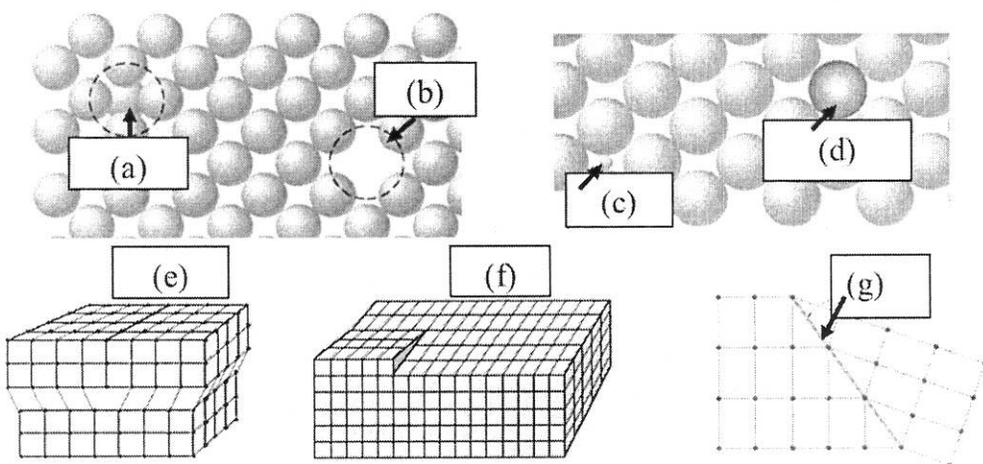


3. Determine whether one item is more likely to amorphous than the other (2%\*4)

- ①. linear polymer or branching polymer
- ③. isotactic polymer or stereoisomers polymer

- ②. small molecular weight or large molecular weight
- ④. block copolymer or random copolymer

4. Identify the defect in below figure (2%\*7)



背面繼續

5. Match (2%\*6)

Steady state diffusion \_\_\_\_\_

Nonsteady-state diffusion \_\_\_\_\_

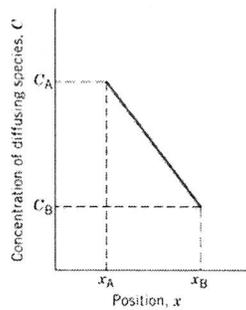
A. The flux is dependent of time

B. The flux is independent of time

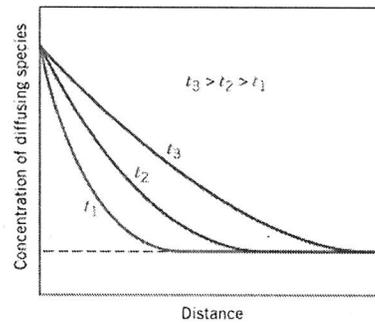
C.  $\frac{\partial C}{\partial t} = D \frac{\partial^2 C}{\partial x^2}$

D.  $J = -D \frac{dC}{dx}$

E.



F.



6. (a) What is the difference in definition between engineering stress and true stress in tensile test of materials? (5%)

(b) Define Poission's ratio. (5%)

(c) On a tensile stress-strain plot, draw a curve of high strength and low toughness and a curve of low strength and high toughness. (5%)

7. (a) Does a metal with smaller average grain-size have a lower or a higher mechanical strength? (4%)

(b) Explain the answer in (a) using dislocation concept. (5%)

8. (a) Does the mechanical strength increase or decrease when an originally cold-worked metal is fully recrystallized? (4%)

(b) Explain the answer in (a) using dislocation concept. (5%)

9. Plot a phase-transformation rate versus temperature curve. (9%)

10. Plot a typical phase diagram containing a eutectic reaction. (8%)