

### 3.40J/22.7J Modern Physical Metallurgy Assessment Quiz

Name:

Course:

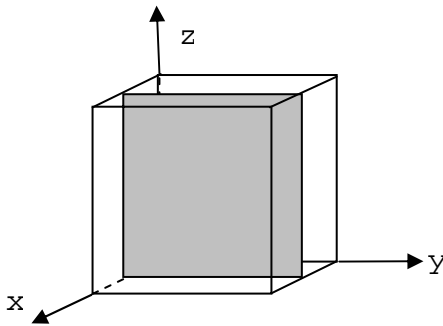
Email:

Grade/Audit:

1. Name and sketch the crystal structure of Cu.

2. What is the primary slip system for Cu?

3. What are the Miller indices of the plane shown below, with reference to the cubic axes (x,y,z)?



4. What are 2 experimental tools (instruments) you would use to determine whether a metal alloy was crystalline or amorphous?

(1)

(2)

Do you know the operating principles of these tools (yes/no)?

5. Draw an edge dislocation schematically and indicate the Burger's vector and dislocation line direction.

6. How can you calculate the force felt by one dislocation due to another nearby dislocation?

If you don't recall the exact method, how is this force related mathematically to the Burger's vector of the first dislocation?

7. What is annealing, and how do you think this will affect the resistivity of a copper line used to connect integrated circuit components?

Increase or decrease:

Why:

8. What is recrystallization, and how does it affect the average grain size of a polycrystalline alloy?

9. What are one advantage and one disadvantage to reducing the grain size of an alloy to be used in high temperature-high mechanical stress applications?

Advantage:

Disadvantage:

10. How can one distinguish a spinodally decomposed microstructure from an order-disorder transformed microstructure, and which one is more stable at elevated temperature?