Assignment 3

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment.

1. What is the minimum interplanar spacing required for Bragg's diffraction?
   - \( \frac{\lambda}{4} \)
   - \( \frac{\lambda}{2} \)
   - \( \lambda \)
   - \( \lambda/2 \)

   1 point

2. The Millerindices \( h, k, l \) of lattice planes in a FCC lattice should satisfy which of the following X-ray diffraction-reflection rules?
   - \( h + k + l \) should be even
   - \( h, k, l \) and should all be either even or odd
   - \( h, k, l \) should have Pythagorean triple
   - All planes allow reflections

   1 point

3. When the source of X-rays is changed from Cu (Gapper) to Mo (Molybdenum), what will happen to the peaks in X-ray diffraction pattern?
   - Will disappear
   - Some of the peaks will shift randomly
   - All the peaks will shift
   - Peak position will not change, but peak intensity will change

   1 point

4. An asymmetric error (or shift) in XRD peak position indicates:
   - Preferred orientation
   - Microstrain
   - Sample displacement
   - Diffraction

   1 point

5. Planes the \( h, k, l \) and \( 2\alpha \) spacing of diffraction patterns are \( 1A, 2A, 3A \) and \( 4A \) respectively, which would be its Miller indices?
   - \( 211 \)
   - \( 221 \)
   - \( 122 \)
   - \( 123 \)
   - \( 203 \)

   1 point

6. What will be the interplanar spacing \( d (in \text{nm}) \) of first order reflection occurs at 20° for an X-ray wavelength of 0.154 nm?

   1 point

7. Find the wavelength for second order reflection if the angle of incidence is 30° using Bragg's law?

   1 point

8. Match the following condition for the crystal structures, where the reflections will be systematically absent (Structure factor \( F = 0 \)).

   | A - Simple cubic | 1 - \( \{100\} \) a = odd |
   | B - Face-centered cubic | 2 - \( \{110\} \) a = even |
   | C - Body-centered cubic | 3 - \( \{112\} \) a = odd |
   | D - Face-centered cubic | 4 - \( \{001\} \) a = odd |

   3 points

   Accepted Answers: A, B, C, D, D