Electron Diffraction and Imaging

Assignment No – 07 (Solution)

1. **The shape factor depends upon,**
   a. The number of lattice points in the unit cell
   b. The number of atom present in the motif
   c. The atomic scattering factor of the atom
   d. The volume of the irradiated sample

2. **The dynamic scattering occurs due to**
   a. Multiple diffraction from the parallel planes
   b. Single diffraction from the parallel planes
   c. Elastic scattering followed by inelastic scattering
   d. Inelastic scattering followed by elastic scattering

3. **If the scattered beam is scattered again in the direction of incident beam then, what would be the phase shift of the doubly scattered beam?**
   a. Phase shift of π
   b. Phase shift of $\pi/2$
   c. Phase shift of $\pi/4$
   d. No phase shift will occur

4. **The two beam condition means that,**
   a. There are only two diffraction spots in the SAD pattern
   b. The incident beam is scattered twice
   c. The direct beam and the diffracted beam are only strongly excited
   d. All of the above

5. **Translational Moiré fringes appears in,**
   a. The overlapping crystals having identical lattice parameter
   b. The overlapping crystal having identical lattice parameter but slightly rotated
   c. The overlapping crystals having slightly different lattice parameter
   d. strained crystals

6. **Kinematical theory is more valid for**
   a. Smaller value of deviation parameter s
   b. Larger value of deviation parameter s
   c. Large diffraction vector
   d. Very thin region of the sample

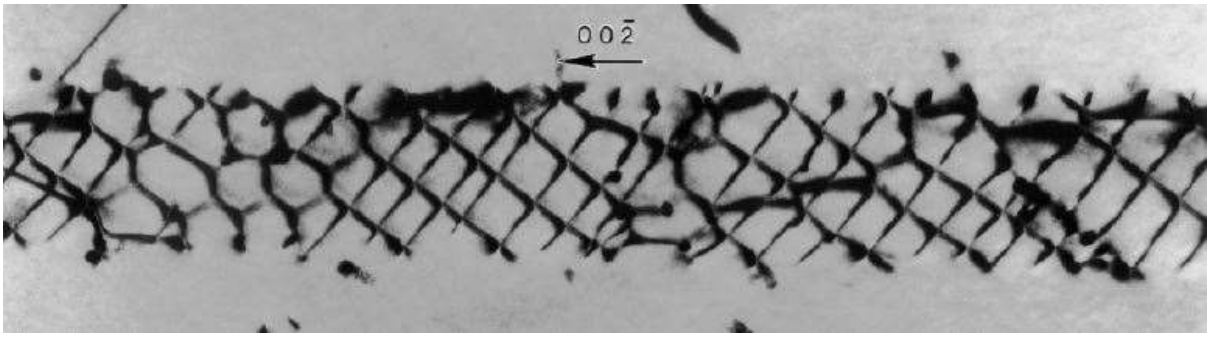
7. **What are the possible changes likely to occur in the image of an edge dislocation line when the sample is tilted along an axis parallel to dislocation line direction?**
   a. Image of dislocation can shift its position
   b. Image of dislocation will split into two

c. Image of dislocation may disappear
d. Width of the dislocation changes

8. **The bend contour appear in samples during examination in TEM due to,**
   a. **Rotation of the sample**
   b. Crystal having different lattice parameter
   c. Bending of diffraction planes in the sample
   d. Sample having variable thickness

9. **If a dislocation is invisible for two g vectors 2-20 and 11-2, then Burgers vector b is,**
   a. [111]
   b. [-1-11]
   c. [-11-1]
   d. [1-11]

10. **Identify the defect in the TEM image.**



   a. Stacking fault
   b. Dislocation net work
   c. Twin boundary
   d. Grain boundary

11. **Stacking faults are imaged with different g vectors. Fault vector is 1/3[11-1]. Find out the g vector(s) for which fault is invisible**
   a. (200)
   b. (020)
   c. (1-10)
   d. (11-1)

12. **Under g.b = 0 the invisibility condition,**
   a. the contrast of screw dislocation completely vanishes
   b. the contrast of edge dislocation completely vanishes
   c. the contrast of mixed dislocation completely vanishes

d. the contrast of Frank dislocation loops completely vanishes

13. Choose the correct statements

a. For the g values for which partials dislocations go out of contrast, stacking faults invariably go out of contrast

b. For the g values for which partials dislocations go out of contrast, stacking faults need not go out of contrast

c. For the g values for which partials dislocations go out of contrast, stacking faults are always in contrast

d. For those g values for which the stacking faults are in contrast, partials bounding the stacking faults are also in contrast

14. Choose the correct statements

a. The contrast of dislocation loop is independent of loop size

b. The contrast of dislocation loop is dependent on loop size

c. Frank and shear loops have the same Burgers vector but different slip planes in fcc crystals

d. Frank loops and shear loops have the same slip plane but different Burgers vectors in fcc crystals

15. Choose the correct statements

a. The wavelength of the electrons inside the sample is more than that of wavelength of the incident electron beam.

b. The wavelength of the electrons inside the sample is the same as that of wavelength of the incident electron beam

c. The wavelength of the electrons inside the sample is less than that of the wavelength of the incident electron beam

d. The wavelength of the electrons inside the sample is the same as that of orbital electron wavelength in the sample

NOTE: If you need any explanation for any of the question, you are welcome to write us on the forum. ---- NPTEL Team.