1. Briefly describe the technique of solvent slow-diffusion to grow single crystals.

2. Draw a possible centric and primitive unit cell on the picture below and list the symmetry operators for the centered cell:

3. Explain the difference between an orthorhombic and a cubic lattice.

4. Explain with a simple drawing what is the difference between a tetragonal P and I cell.

5. Explain the meaning of the symbol C2/c used to define one of the possible space groups of the monoclinic lattice.
6. Explain with simple words the Bragg’s law and why the condition $n = 1, 2, 3 \ldots$ must be satisfied for an X-ray reflection to be generated.

7. Give the Miller indices for the X-ray reflections generated by the planes depicted below.

8. Explain the coherent scattering of X-ray by one atom.

9. Labels the X-ray radiations (Kα1, Kα2, etc.) according to the way they are generated.

10. Give the Miller indices for the reflection below:

11. List the symmetry operator for H₂O.

12. List the symmetry operators for a monoclinic unit cell.

13. Explain in simple words the difference between observed and calculated structure factors. Also explain the role of the convergence factor “R”.

14. Briefly explain with some drawings what causes for a reflection being either strong or weak.