Module II: Quiz

1. **Why atoms vibrate in lattices?**

2. **What are the classical and quantum oscillator models?**

3. **What are phonons and what is the reason for the "quantization"of phonons?**

4. **How the combination of *l* and *k* phonon quantum numbers can be interpreted?**

5. **Assuming 1D lattice of N atoms with interspacing *a*, what are the lowest and highest *k* numbers?**

6. **What oscillator models are considered in Dulong-Petit, Einstein and Debye models for the lattice heat capacity?**

7. **What are cut-off k_D and ω_D in Debye's model? Why there is a cut-off?**

8. **What process limits heat conductivity at low temperatures?**

9. **What process limits heat conductivity at high temperatures?**

10. **Why it is essential to account for anharmonic vibration modes in order to explain the termal expansion in solids?**