

Module 1 Unit 1

PRINCIPLES OF LASERS - QUESTIONS

(As per Revised Curriculum SVU R-2023)

1. What are lasers? How is a laser different from ordinary light?
 2. Differentiate between laser and ordinary light. Give some examples for each.
 3. State and explain laser beam parameters.
 4. Define monochromaticity, coherence length and divergence of laser beam.
 5. Explain: absorption, spontaneous and stimulated emission. Write the rate equations for each process.
 6. How stimulated emission is different from spontaneous emission? What are its advantages?
 7. Explain why we do not observe laser in normal conditions.
 8. Determine the ratio of Einstein's A and B coefficients OR show that it becomes progressively difficult to obtain laser emission at shorter wavelengths.
 9. Show that under normal conditions, lower energy levels are highly populated as compared to upper energy levels.
 10. What is population and population inversions? Explain its significance for emission for laser.
 11. What is metastable state? State its importance.
 12. What is resonance cavity? What is its significance? Explain how resonance cavity is designed to achieve laser emission.
 13. What is pumping? What are different types of pumping? State examples for each.
 14. Why four level pumping is efficient than three level pumping?
 15. Derive the threshold condition for lasing.
- =====