IILM UNIVERSITY

| Assignment No. : 03 (Module 3: Laser & Fiber Optics) | | | |
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| **Subject** | **Physics** | **Subject Code** | **UBS1008** |

## SHORT QUESTIONS

1. Explain the Population Inversion in a laser system? Give two necessary conditions for lasing action.
2. Define metastable state.
3. Write difference between spontaneous and stimulated emission?
4. Give some applications of laser in industries.
5. Give the advantage of four level laser systems over three level systems.
6. What is the principle of operation of an Optical fiber?
7. What are the main components of an optical fiber?
8. Give few important applications of optical fiber.
9. Give the differences between step index and graded index fiber? Explain briefly
10. Explain attenuation and dispersion in optical fiber. Why Modal dispersion is negligible in single mode fiber?

## LONG QUESTIONS

11. Explain the Einstein's coefficients A and B? Establish a relation between them.
12. Describe the essential components of a Ruby laser with the help of diagram. Explain its working with help of the relevant energy diagram.
13. Discuss the He-Ne laser with necessary energy diagram. **C**ompare it with ruby laser.
14. Explain single mode and multimode fiber. What are advantages of optical fiber over copper wire?
15. With reference to optical fibers, obtain an expression for the acceptance angle in terms of refractive indices of the core material, cladding material and that of medium outside the fiber.