

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2011-12 & thereafter)

SUBJECT CODE : 11PH/ME/LP63

B.Sc. DEGREE EXAMINATION APRIL 2015
BRANCH III - PHYSICS
SIXTH SEMESTER

COURSE : MAJOR ELECTIVE
PAPER : LASER PHYSICS
TIME : 3 HOURS

MAX. MARKS : 100

Section-A

10X3=30

Answer all Questions:

1. What does the term laser stand for? Who gave the first theoretical explanation for laser oscillation?
2. What is meant by spontaneous emission?
3. What is the principle of ruby laser?
4. Name the types of laser?
5. First molecular gas laser was developed by whom? What are the advantages of molecular gas laser?
6. Explain the working of CO_2 laser.
7. What are the advantages of semiconductor laser?
8. Explain how a hologram differs from an ordinary photograph?
9. Name any three uses of laser in medical.
10. What is Lidar? Where is it used?

Section-B

5X6=30

Answer any Five Questions:

11. What is population inversion and explain the methods of achieving population inversion?
12. Distinguish between spontaneous and stimulated emission of radiation.
13. Explain the characteristics of laser?
14. Compare Nd-YAG, CO_2 and Semi conductor laser.
15. What are the advantages and disadvantages of He-Ne laser?
16. What are the applications of holography?
17. Mention the important industrial applications of a laser.

Section-C

2X20=40

Answer any Two Questions:

18. Derive Einstein's relation for stimulated emission and hence explain the existence of stimulated emission.
19. Describe the construction, energy level diagram and working of Nd-YAG laser.
20. What is a gas laser? Describe the construction and working of CO_2 laser with necessary diagrams.
21. Explain with a neat sketch the construction and reconstruction of a hologram using laser beam. What are the characteristic features of Holography?

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