

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

SUBJECT CODE : 11PH/ME/LP63

B.Sc. DEGREE EXAMINATION APRIL 2014
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. Define Quantum energy of Light.
2. Define Optical Resonator.
3. State the characteristics of Laser beam.
4. What do you mean solid state Laser?
5. Write a Short note on Dye Laser?
6. Give a Brief Explanation about vibrational modes of CO₂ molecule.
7. State the efficiency of semiconductor Laser.
8. Write a note on Holography.
9. How Laser is used in drilling of metal?
10. What do you mean by LIDAR?

Section-B

5X6=30

Answer any Five Questions:

11. Explain thermal equilibrium of a system.
12. Describe the pumping methods to achieve population inversion.
13. What do you mean Line broadening? Explain Doppler broadening.
14. Explain the construction and operation of Ruby Laser?
15. Describe the working of HCl Laser.
16. Explain the operation of Injection Laser.
17. Describe the velocity measurement process using Laser.

Section-C

2X20=40

Answer any Two Questions:

18. Derive the rate equation for three level Laser system.
19. Explain CO₂ Laser with various vibrational modes of CO₂ molecule.
20. Describe the construction and working of Hologram and list its advantages and applications.
21. Explain the following applications of Laser.
 - i. Bar code scanning (5)
 - ii. Optical communication (5)
 - iii. Isotope separation (4)
 - iv. Nuclear Fusion (6)

