

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2019 – 2020 and thereafter)
SUBJECT CODE:19PH/ME/LP45

B.Sc. DEGREE EXAMINATION APRIL 2022
BRANCH III - PHYSICS
SIXTH SEMESTER

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

MAX. MARKS : 100

SECTION - A

ANSWER ALL QUESTIONS:

(10x3=30)

1. What is population inversion. How is it achieved?
2. What do mean by optical cavity?
3. What is the role of metastable state in lasing action?
4. If the light wavelength 550 nm have wave trains 10.5×10^{-6} m long, calculate its coherence length.
5. State any two advantages of Dye laser.
6. What is the classification of gas lasers?
7. Define the process of doping in semiconductors.
8. How holography is different from photography?
9. How is laser used in nuclear fusion reaction?
10. Name any three uses of lasers in medical.

SECTION B

ANSWER ANY FIVE QUESTIONS

(5x5=25)

11. Discuss various pumping methods used in the Lasers for obtaining population inversion.
12. With neat sketch explain why the optical resonator required in laser.
13. Explain the working of Nd-YAG laser with energy level diagram.
14. Explain the concept of Doppler broadening of spectral lines.
15. Describe the working CO₂ laser with suitable diagram.
16. How image is reconstructed in hologram?
17. Describe the application of laser in eye surgery.

SECTION C

ANSWER ANY THREE QUESTIONS

(3x15=45)

18. Explain the Einstein's theory of spontaneous and stimulated emission.
19. Obtain the relation for optimum output power of three level laser system
20. Describe the construction and working of He-Ne laser with necessary diagram.
21. Explain the main features and conditions for laser action in semiconductor laser.
