STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2008-09 & thereafter)

SUBJECT CODE : PH/ME/LP54

B.Sc. DEGREE EXAMINATION NOVEMBER 2012
BRANCH III - PHYSICS
FIFTH SEMESTER

COURSE   :   MAJOR – ELECTIVE
PAPER   :   LASER PHYSICS
TIME   :   3 HRS.   MAX. MARKS : 100

SECTION – A

ANSWER ALL QUESTIONS: **(10 x3 =30)**
1.   What is the expansion for the acronym LASER and define population inversion?
2.   What do meant by Optical resonator?
3.   Enumerate the characteristics of Laser beam.
4.   State reasons for the width and shape of lines in Solid state Laser.
5.   Draw the Energy level diagram of He-Ne Laser.
6.   State any two advantages of Dye Laser.
7.   What is the principle of operation of Hologram?
8.   Write a note on Holographic interferometer.
9.   How Laser is used in nuclear fusion reaction?
10.   What is the role of Laser in communication systems?

SECTION – B

ANSWER ANY FIVE QUESTIONS: **(5X6=30)**
11.   Explain the characteristics of Spontaneous and Stimulated emissions.
12.   Define population inversion and give a qualitative explanation.
13.   Explain the construction and working of ruby laser.
14.   Explain Dye laser with suitable diagram,
15.   Describe the basic structure of p-n junction laser.
16.   How image is reconstructed in Hologram?
17.   Explain the process of laser in i) welding   and ii) drilling

SECTION – C

ANSWER ANY TWO QUESTIONS: **(2X20=40)**
18.   Derive the relationship among Einstein coefficients and get the condition for stimulated
      emission to dominate spontaneous emission.
19.a. Describe the components of laser.   (8 marks)
   b. Explain and compare three level pumping schemes and four level pumping scheme of
      laser action .   (12 marks)
20.a. Explain different modes of vibrations of CO_2 molecule.   (7 marks)
   b. Describe CO_2 laser with suitable diagram.   (13 marks)
21.   Describe the applications of Laser in i) cancer therapy
                                          ii) eye surgery
                                          iii) in defense
                                          vi) in communication (with block diagram)

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