B.E (FULL TIME) DEGREE END SEMESTER EXAMINATIONS, APR/MAY 2013

MATERIALS SCIENCE AND ENGINEERING

EIGHTH SEMESTER (R 2008)

ML 9034-LASER PROCESSING OF MATERIALS

23

TIME: 3 Hrs. Max. Marks: 100

Answer all questions

Part-A (10 x 2 = 20 marks)

1. What do you understand by Fabry-Perot resonator?
2. What do you understand by mode volume?
3. What are the different modes by which energy have been transferred from laser beam to the work piece?
4. Mention the possible configurations of the heat source used in laser processing with examples.
5. What are the zones in laser surface melting?
6. Mention the advantages of laser ablations.
7. What are the different process defects that arise during laser drilling operation?
8. Mention the functions of assist gas used in laser cutting process.
9. Define the term spiking.
10. Write an expression for efficiency of a laser welding process.

Part – B (5x 16 = 80 marks)

11. Obtain an expression for heat flow in thick plate with point heat source.

12. (a). Obtain the relationship between Einstein coefficients and hence determine the probability for stimulated emission under thermal equilibrium.

(OR)

12. (b). Discuss the principle and working of molecular gas laser.

13. (a). Explain the process parameters and methods of coating in laser physical vapour deposition.

(OR)

13. (b). Discuss with schematic the principle and steps involved laser hardening process and its industrial applications.

14. (a) Discuss briefly the various forms and components of laser drilling process.

(OR)

14. (b) Describe the principle, components and defects in laser cutting process.

15. (a) Write a brief note on (i) Laser Welding defects. (10)

(ii) Suitability of laser welding on dissimilar materials. (6)

(OR)

15. (b) Explain the mechanisms involved in laser welding.