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B.E (FULL TIME) DEGREE END SEMESTER EXAMINATIONS, APR / MAY 2014

MATERIALS SCIENCE AND ENGINEERING

EIGHTH SEMESTER (R 2008)

ML 9034-LASER PROCESSING OF MATERIALS

TIME: 3 Hrs.

Max. Marks: 100

Answer all questions

Part-A (10 x 2 = 20 marks)

1. What do you understand by resonant energy transfer?
2. Define the term population inversion.
3. What do you mean by Quasi-stationary state?
4. What do you understand by the term glazing?
5. What are the zones in laser surface melting?
6. Write an expression for dilution of a clad material.
7. Mention the technique used for cutting ceramics.
8. Define "Trepanning".
9. Specify the processing efficiency for laser welding.
10. What is key hole effect?

Part -- B (5x 16 = 80 marks)

11. Explain the principle involved molecular gas laser with suitable example.
12. (a). Obtain an expression for heat flow in thin plate with line heat source.

(OR)

12. (b). Discuss the principle, steps and process parameters of laser surface heat treatment.
13. (a). Explain the process parameters and methods of coating in laser direct metal deposition.

(OR)

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

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

(OR)

14. (b) Describe the process parameters, characteristics and defects in laser drilling process.

15. (a) Discuss the effect of beam characteristics and discontinuities in laser welding.

(OR)

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