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**B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2014**

Material Science

VII Semester

**ML9402 Non Destructive Materials Evaluation**

(Regulation 2008)

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

**PART-A (10 x 2 = 20 Marks)**

Answer all questions

1. What is NDT? Explain the benefits of NDT.
2. Explain the factors to be considered while selecting the NDT technique for The Particular application.
3. What are the principle requirements of penetrants.
4. What are the advantages, disadvantages and applications of magnetic particle inspection.
5. What are the functions of eddy current inspection system?
6. Describe the operating variables affecting the performance in Eddy current inspection
7. Write a note on basic equipments used for ultrasonic inspection.
8. Explain pulse echo method.
9. What are the types of intensifying screens are used in industrial radiography?
10. The penetrating power of an X ray machine is indicated by\_\_\_\_\_

**Part B ( 5 X 16 mark = 80 mark)**

11. Discuss in detail the basic operations to be carried out any NDT.
12. (a) (i) Write a note on penetrant flaw detection with the post emulsifier penetrants.  
(ii) Compare and contrast the fluorescent penetrants and dye penetrants. List some of the commonly used penetrants.

OR

(b)(I) Suggest NDT methods that might be used to identify:

- i Surface defects with a metal
- ii. Surface defects with a plastic
- iii. Internal defects with a metal

(II) Discuss the use of magnetic methods in measurement of magnetic properties.

13. (a) Discuss the following:

- (i) Cracks detection with Eddy currents.
- (ii) Metal sorting with Eddy currents.

OR

- (b) (i) Distinguish between Eddy current and Magnetic inspection methods .
- (ii) Discuss the various applications of the Eddy current inspection

14)(a)(I) What are the parameters used to characterize acoustic emission signals? Briefly explain.

(II) Discuss the following applications of acoustic emission technology.

- i. Prediction of fracture in metals
- ii. In-sight inspection of aircraft.

OR

(b) Discuss the various special techniques available for ultrasonic NDT.

15.a) Write a note on various special radiographic techniques.

OR

(b)(i) Give the limitations of x-ray diffraction method and ultrasonic method for determining residual stresses. How these are overcome by electromagnetic techniques.

(ii) Name various electromagnetic stress measurement techniques. What magnetic properties are used for the estimation of residual stresses in these techniques?