

B. E. (Full Time) Degree End Semester Examination 2011 Arrear
Materials Science and Engineering Branch
Seventh Semester – Regulations 2004
ML 472 – Non Destructive Evaluation

(11)

Time: 3 hours

Maximum Marks: 100

Answer All Questions

Part – A (10 x 2 = 20 Marks)

1. Can Infrared Thermography be used to test power transmission circuits? What is measured?
2. Which ultrasonic wave mode cannot propagate in air?
3. Which materials are not suited for Eddy current testing?
4. Liquid penetrant testing can be performed when magnetic particle testing fails. Why?
5. What is the cause of colour blindness?
6. Is scotopic vision suitable for visual inspection?
7. What is the minimum contrast the human eye can detect?
8. What is the main difference between TOFD and conventional ultrasonic NDT?
9. Name one volume and one surface inspection method.
10. What is computed in CT (computed radiography)?

Part – B (5 x 16 = 80 Marks)

Question 11 (16 marks)

(8 marks) Discuss four (4) testing applications with the respective NDT method used.

(8 marks) Standard abbreviations are used for NDT methods. Expand VT, MT, LT, PRT, UT, RT, IR, PT

Question 12a . (16 marks)

- i) (8 marks) Draw the testing symbol used in a technical drawing for the following task:
A weld is to be tested by liquid penetrant testing on a construction site (field joint).

- ii) (8 marks) Define contrast and definition in Radiography.

OR Question 12b.(16 marks) Ultrasonic testing data are presented in different ways. Explain how A-, B-, C-scans are acquired and presented. Why do C-scan images require gating?

Question 13a (16 marks). Eddy Current Testing is a versatile testing method. Which material properties can be tested by this method? Elaborate.

OR Question 13b (16 marks). Name and explain the physical principle of two NDT surface inspection methods?

Question 14a (16 marks) In magnetic particle testing, how are components to be tested magnetized? How does this influence the sensitivity to defect orientation? Draw a sketch for the different magnetization and include an oriented defect that can be detected.

OR Question 14b (16 marks) Draw the geometric relationship that leads to geometric unsharpness in radiographs. How can sharpness be maximized? How this has an influence on exposure time?

Question 15a (16 marks) In eddy current testing, which parameters controls the depth of penetration of the eddy currents? Can the center of a rod be inspected with sufficient penetration of eddy currents? How can we distinguish between cracks located at different depths?

OR Question 15b (16 marks) Explain the generation of X-rays with an electric vacuum tube (sketch and identify key elements). How can the energy and intensity of the X-ray beam be adjusted? Where is the high voltage applied? Draw a graph that schematically illustrates the energy and intensity

relationship of X-rays produced with 100 kVolt and 200 kVolt acceleration voltage at the same current.