Roll No. | | | | | | | | | | |

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

Mechanical Engineering

Eighth Semester

ML 9402 – NON DESTRUCTIVE MATERIALS EVALUATION

(Regulation 2008)

Time : 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. *Describe the calibration of Yoke Magnetic Instrument which is capable of operating on both AC/DC methods before testing the specimen.*
2. *Why precleaning is given for more importance in Penetrant Testing and also specify some of the cleaning methods adopted in LPI.*
3. State the recommendation of the current requirement in Prod magnetization and calibration methods in determining its magnetic strength ?
4. List out the required details of Gamma Ray sources Ir 192 & Co 60 for Radiographic Testing Inspection on Steel Components.
5. Define a). Near Zone and b).Dead Zone in Ultrasonic testing
6. Why do we use Wire & Hole Type Penetrameter in RT?
7. How the size of the Longitudinal defect is being determined in Ultrasonic Testing?
8. Define the terms used in Eddy Current Testing a).Fill Factor and b). Lift Off.
9. What is the principle behind Infrared Thermographs and its significance in NDT?
10. What are the various types of Image formation in Radiography Testing?

Part – B (5 x 16 = 80 marks)

11. How the welding Inspection on Butt weld Joints in steel is being performed in UT? What are the precautions to be followed on Weld Inspection while performing UT with respect to ASME Standards? Draw necessary sketches and echo levels on drawing DAC curve with the reference Block of T-24 mm having 3mm dia side drilled Holes at ¼ T and 1/2T at its ends with 70 Deg angle Probe.

12. a) Describe the performance of Liquid Penetration Testing on the test specimens with Fluorescent Type Penetrants? What are the limitations of Liquid Penetrants Inspection? How the defects are evaluated and recorded in LPI?

(OR)

b) Why Magnetic Particle Inspection cannot be performed on certain Stainless Steel Materials? Which MPI Technique is the most sensitive method for detecting Sub surface defects? What are the characteristics of Magnetic Testing Powders?

13. a) A Steel Pipe of outer dia 219 mm and thickness 10 mm requires Radiographic Testing on its butt weld with X ray -200 Kv source with the focal size of 3mm. What is the exposure when RT was taken by SWSI and DWSI by using the graph given below? If the radiation from the source at a distance of 1 Meter measures as 5 R calculate the safe distance for the operator in receiving safe limiting dosage of 2milli Rontgen.

(OR)

b) i).Discuss the advantages and disadvantages of Computed Radiography .Define Computed Tomography and the principle on its Image formation
ii).Explain Real Time radiography and its advantages in NDT evaluation.

14. a) *Define Acoustic Impedance? .How the reflection & transmission Coefficients are* determined when sound waves were transmitted between mediums of different acoustic Impedances. Illustrate with the required sketches on the Oblique transmission of Ultrasonic waves on steel from Perspex at various angles from 0-90 Deg .Calculate the Incident angles of Sound waves for the occurrence of the critical angles when sound travels from Perspex to Steel medium.. .

(OR)

b) Draw V1 and V2 Blocks with necessary dimension details. How the range setting is made in UT with V1 and V2 Blocks esp for setting up the ranges of 250 mm and 375 mm with angle probe in CRT Screen. Draw sketches with Echo Heights observed with V1 and V2 Calibration blocks.

15. a) Discuss in details TOFD and Phased array Techniques in UT.

(OR)

b) Brief out out the causes of various Welding defects that normally occurred and its image formation in Radiographs. What are the defects traceable in Steel Plates, Forging, welding & Castings by RT and UT?.

X Ray Chart Drawn at SFD of 700mm
(Note:Safe Operating Voltage 160 Kv)