Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech (EIE-N)/SEM-8/EI-801B/2011

2011

NON-DESTRUCTIVE TESTING METHODS

Time Allotted : 3 Hours Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

i) When performing a liquid penetrant test, the surface of the part under inspection should be

a) Slightly damp

b) Clean and smooth to the touch water soluble

c) Free of oil, grease, water and other contaminants

d) All of these.

ii) Materials can be demagnetized by

a) Heating above their curie temperature

b) Subjecting the component to a reversing and decreasing magnetic field

c) Both (a) and (b)

d) None of these.

iii) The active elements of most acoustic transducers used today is

a) Lithium b) Piezoelectric ceramic

c) Sulfide d) Quartz.

iv) Resolution of Ultrasonic Testing generally increases

a) with increased depth of a defect

b) with a decrease in the transducer frequency

c) when the transducer diameter is reduced

d) with an increase in transducer frequency.

v) Longitudinal waves are also called

a) Surface waves b) Pressure waves

c) Compressional waves d) Both (b) and (c).

vi) Which type of screen presentation displays the amount of received ultrasonic energy as a function of time ?

a) *A*-scan b) *B*-scan

c) *C*-scan d) All of these.

vii) A specific radioactive source will always produce gamma rays at the same

a) Intensity b) Activity

c) Energy levels d) None of these.

viii) Computed tomography *X*-ray techniques allow the test component to be

a) Viewed in various cross-sectional slices

b) Viewed from different angles

c) Analyzed for chemical composition

d) None of these.

ix) *X*-rays and Gamma rays have significant penetrating power due to their

a) Short wavelength

b) Medium wavelength

c) Long wavelength

d) Wide range of wavelength.

x) The most commonly use band for commercial infrared imaging is between

a) 0·12 μm – 0·7 μm b) 0·75 μm – 15 μm

c) 15 μm – 30 μm d) 35 μm – 100 μm.

xi) When testing for subsurface flaws, the frequency should be

a) As high as possible

b) As low as possible

c) Calculated to produce a 90° difference between the liftoff and flaw signals

d) None of these.

xii) When flaws are in unknown locations, radiography is best suited for the detection of

a) Volumetric defects such as porosity

b) Tight linear defects such as cracks

c) Material delaminations

d) The flaw type does not matter.

GROUP – B
(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

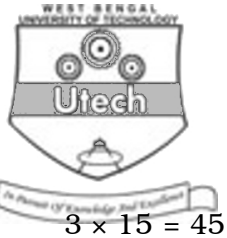
2. Make a comparison between destructive and non-destructive test.

3. What are the safety precautions essential to perform a liquid penetrant test ?

4. What are the limitations of MPT process ?

5. What do you mean by image quality indicator ?

6. What are the basic properties of sound beam ?



GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) Describe the procedure for Liquid Penetrant Testing.

   b) List the various techniques available for magnetizing a component. Briefly describe any one technique.

   c) Which procedure used for testing a component using MPT method ? 5 + (2 + 3) + 5

8. a) What do you mean by Eddy current ? Draw the block diagram of Eddy current test instrument and describe briefly.

   b) What are the properties of *X*-Ray and Gamma Ray ?

   c) What are the techniques used in Radiographic inspection ? Describe one of the techniques.

   (2 + 5) + 3 + (1 + 4)

9. a) Make a comparison between longitudinal wave and transverse wave.

   b) What are the inspection techniques used in Ultrasonic testing method ?

   c) List the advantages and limitations of Ultrasonic testing method ? 4 + 8 + 3

10. a) Describe experimental test setup for AET with simple block diagram.

    b) Show how Holography used in Visual Inspection Method in NDT.

    c) What is the basic principle used in helium leak detector ? Describe the different techniques used in this detector. 5 + 3 + (2 + 5)

11. Write short notes on any *three* of the following : 3 × 5

    a) Thermography

    b) ISO standard for NDT

    c) Electron microscopic technique

    d) Radiation backscatter

    e) Different steps of LPT

    f) Magnetizing techniques.