

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2940

Roll No.

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**B. Tech.**

(SEM. VIII) THEORY EXAMINATION 2011-12

**NON-DESTRUCTIVE TESTING**

*Time : 3 Hours*

*Total Marks : 100*

**Note :—** Attempt all questions.

1. Attempt any **two** parts of the following :— **(10+10)**
  - (a) What do you understand by Non-destructive testing ?  
And explain the roll of Non-destructive testing on manufacturing today.
  - (b) Differentiate destructive and non-destructive testing.  
Explain rigging test for detection of surface cracks with the help of neat sketch.
  - (c) Explain procedure of visual inspection test and acceptance criteria of job.
2. Attempt any **two** of the following :— **(10+10)**
  - (a) Explain the working principle and steps involved in liquid penetrant test for detecting surface defect on the heat treated object.
  - (b) What do you understand by magnetic hysteresis ? Explain different magnetization technique using magnetic particle testing, and their sensitivity.

- (c) Explain the importance of penetrant and developer. In a good penetrant and developer what are the required properties ? Explain.
3. Attempt any **two** of the following :— (10+10)
- (a) Calculate the Bragg's angle, if X- ray of wavelength 1.542 Å deflected by plane (121) and interatomic spacing is 2.43 Å. Assume first order reflection.
- (b) Derive the Bragg's equation for detecting interplaner spacing and interatomic spacing of material by reflection of X-ray to the crystal plane.
- (c) What do you understand by radiation ? Explain with the help of neat sketch the method of X- ray generation.
4. Attempt any **two** of the following :— (10+10)
- (a) Explain how acoustic impedance of material affects ultrasonic inspection. With the help of neat sketch explain the working of a piezoelectric transducer.
- (b) What are the advantages of using ultrasonic inspection as compared to the X- ray radiography ? Explain two ultrasonic inspection techniques for detection of sub layer cracks in the materials.
- (c) Explain the various factors affecting pulse generated from the ultrasonic probe and write the importance of couplant used in ultrasonic inspection.
5. Attempt any **four** of the following :— (5+5+5+5)
- (i) Distinguish between eddy current inspection method and magnetic particle testing.

- (ii) Discuss the need and necessity of demagnetization of object after magnetic particle testing.
- (iii) Explain magneto optics imaging technique using in eddy current inspection.
- (iv) Describe the working principle of eddy current inspection in brief.
- (v) Photoelectric effect.
- (vi) Plane Polarization of electromagnetic waves.