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Sub Code: EME062

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**B.Tech**  
**(SEM VIII) THEORY EXAMINATION 2017-18**  
**NON DESTRUCTIVE TESTING**

**Time: 3 Hours****Total Marks: 100****Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A**

- 1. Attempt all questions in brief. 2 x 10 = 20**
- a) Define NDT.
  - b) What do you mean by defects?
  - c) Enlist various fields of application for Non-Destructive Testing.
  - d) Enlist the various equipment involved in visual inspection.
  - e) Define Dwell time.
  - f) What do you mean by Nature of radiation?
  - g) Mention recommendations in film handling.
  - h) Which type of probe is used for restricted spaces and why?
  - i) Define Eddy current.
  - j) What is optical inspection?

**SECTION B**

- 2. Attempt any three of the following: 10 x 3 = 30**
- a) Explain characteristics of ultrasonic beam? If diameter of transducer is D and wavelength is L and field length N then write down the relation between them.
  - b) What is Radiography? Discuss in brief about X-ray Radiography and Y-ray Radiography with suitable applications of both.
  - c) Explain the working principle of Magnetic Particle Testing with neat labelled sketch. Also mention its scope, advantages, disadvantages and applications.
  - d) Derive Bragg's equation for detecting interplanar spacing and interatomic spacing of material by reflection of X-Ray to the crystal plane.
  - e) Discuss in brief about Skin Effect, Direct and Indirect Method of Magnetisation, and Wet Suspension Inspection.

**SECTION C**

- 3. Attempt any one part of the following: 10 x 1 = 10**
- a) Classify different types of penetrant used in liquid penetrant test. Also discuss the role and types of Emulsifiers.
  - b) Explain in brief:
    - i. Ringing test and chalk test.
    - ii. Magnetic particle testing.

4. Attempt any *one* part of the following: 10 x 1 = 10
- a) Differentiate between A scan B scan and C scan representation of ultrasonic inspection data.
  - b) What is magnetic hysteresis and hysteresis-curve explain it?
5. Attempt any *one* part of the following: 10 x 1 = 10
- a) Calculate the Bragg's angle, if X-ray of wavelength  $1.542\text{\AA}$  deflected by plane (121) and interatomic spacing is  $2.43\text{\AA}$ . Assume first order reflection.
  - b) Discuss various types of probes used in ultrasonic testing. Explain the various factors affecting pulse generated from ultrasonic probe. Also discuss the importance of couplant.
6. Attempt any *one* part of the following: 10 x 1 = 10
- a) With neat sketch explain the principle and working of eddy current inspection. Write five application of eddy current inspection
  - b) Discuss in brief
    - i. Photoelectric effect.
    - ii. Sources of radiation in radiographic testing.
    - iii. Scattering factor.
7. Attempt any *one* part of the following: 10 x 1 = 10
- a) Explain the basic processing steps of a liquid penetrant inspection? What are the properties the penetrants must have in order to work well?
  - b) Explain in brief about the rail inspection by eddy current testing method. Discuss the types of probes used in eddy current testing method.