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Sub Code: NME 065

Roll No.

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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) What is Machine Vision? Discuss in brief about the Human Eye.
 - b) What is Radiography? Discuss in brief about X-ray Radiography and Y-ray Radiography with suitable applications of both.
 - c) What do you mean by Destructive testing method? Explain any one in brief. Differentiate it with NDT.
 - 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 Zyglu Fluorescent Penetrant Test, also discuss steps involved, Application, Advantages limitations.

SECTION C

- 3. Attempt any one part of the following: 10 x 1 = 10**
- a) With the help of a case study state the process of ultrasonic testing techniques. Also discuss the advantages, disadvantages, limitation and application of ultrasonic testing.
 - 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) Discuss the working principle of EMAT. What are its advantages over traditional transducers?
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\AA deflected by plane (121) and interatomic spacing is 2.43\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.