

Code No: 07A70607

R07**Set No. 2**

IV B.Tech I Semester Examinations, May 2011
NON DESTRUCTIVE TESTING
Metallurgy And Material Technology

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. With neat sketches explain the major steps in fluorescent penetrant inspection. [16]
2. Which nondestructive testing method is best suited to determine the wall thickness as the bottom of a steel tank? Discuss how it will be done. [16]
3. (a) What is the use of fluorescent magnetic particles?
(b) What are the reasons for demagnetization of parts? Explain various demagnetization methods that are used in industrial practice.
(c) Discuss the applications, advantages and limitations of magnetic yokes and prod contacts used in magnetic particle inspection. [3+6+7]
4. (a) What factors affect the magnitude of induced eddy currents? Explain briefly.
(b) Explain different types of coils used for the detection of eddy currents. [8+8]
5. (a) What is Remanent Magnetization? Explain with the help of Magnetic hysteresis loop.
(b) Write a note on principle and applications of Residual magnetism. [8+8]
6. (a) Name different types of infrared (IR) detectors. Give advantages and disadvantages of IR detectors.
(b) Discuss the applications of thermal methods. [8+8]
7. Discuss in detail the defect detection in solid specimens by Holographic testing. [16]
8. With a neat sketch discuss the working procedure of neutron radiography, and also give applications, advantages and limitations of this method. [16]

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R07**Set No. 4**

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Metallurgy And Material Technology

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
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1. Discuss the important advantages, limitations and applications of the Magnetic Methods. [16]
2. With a neat sketch discuss the principle and working procedure of a 0° twin crystal compressional wave probe. [16]
3. Write a note on various types of developers; and also discuss its properties. [16]
4. (a) For what purposes other than detection of defects can electrical test methods be used?
 (b) How does the type of material being tested and the type of defect being sought affect the choice of test frequency in eddy current inspection?
 (c) Explain the use of :
 i. Double primary coil system and
 ii. Differential coil system for inspection of tubes and bars. [6+5+6]
5. (a) Give the limitations of x-ray diffraction method and ultrasonic method for determining residual stresses. How these are overcome by electromagnetic techniques.
 (b) Name various electromagnetic stress measurement techniques. What magnetic properties are used for the estimation of residual stresses in these techniques? [8+8]
6. (a) Write a short note on Penetrators, which is a device used to measure the radiographic sensitivity.
 (b) Define Image Quality Indicators (IQI), where it will be used? [8+8]
7. Explain the mechanism of image formation in Holography. [16]
8. With a neat block diagram discuss the principle and operation of Acoustic Emission method. [16]

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R07**Set No. 1**

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Metallurgy And Material Technology

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. With a neat sketch discuss the design and working procedure of 0° compressional wave probes. [16]
2. (a) Write short notes on the following:
 - i. Sources of acoustic emission
 - ii. Types of emission
 (b) What are different types of acoustic emission sensors? Explain any two sensors with their relative merits and demerits. [8+8]
3. (a) Discuss the effect of frequency on current penetration.
 (b) Define and explain flux density (B), field intensity (H) and permeability.
 (c) What are the characteristics of eddy current method? Write a note on eddy current generators. [4+4+8]
4. Discuss briefly the method of surface preparation in water washable method. [16]
5. Discuss the recording of radiation by Fluorescent screens. List out the types of materials used for these screens and also discuss the advantages and limitations of this process. [16]
6. (a) Describe eddy current instruments used in identification of defects in castings, forgings and weldments.
 (b) Write a short note on the following:
 - i. Eddy current probes
 - ii. Use of eddy currents in the detection of non-conductive coating. [8+8]
7. Discuss the advantages of using fiber optic coupling for the usage of:
 - (a) Photo diodes and
 - (b) CCD cameras in Dynamic inspection. [16]
8. Write a short note on the following :
 - (a) Field sensitive probes.
 - (b) Measurement of metal properties. [8+8]

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R07**Set No. 3**

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NON DESTRUCTIVE TESTING
Metallurgy And Material Technology

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What are the major objectives of leak testing?
 (b) What are the two basic types of leaks? Explain them.
 (c) What are the common errors in leak testing?
 (d) Explain leak testing by halide torch. [4+4+4+4]
2. Discuss the various advantages of penetrant flaw detection methods? [16]
3. (a) Give the principle and advantages of Magnetic Method.
 (b) What are the limitations of the Magnetic Methods? [10+6]
4. With a neat sketch explain the Ultrasonic inspection of tubing. [16]
5. (a) Discuss the fundamental points to be made for Optical Holography.
 (b) Give important applications where dynamic inspection is needed. [8+8]
6. (a) Draw a neat sketch and explain magnetization curve of a ferromagnetic material indicating the significance of the size/width of the loop.
 (b) Discuss the applications of electromagnetic testing in NDT. [8+8]
7. (a) Which NDT method is best suited to determine the wall thickness at the bottom of a steel tank? How it will be done.
 (b) Discuss the Barkhausen noise techniques in detail. [8+8]
8. With a neat sketch discuss the working procedure of Television - fluoroscopic system with a linear array of detectors. (Group 3). [16]
