

Code No: 07A70607

R07**Set No. 2****IV B.Tech I Semester Examinations, November 2010****NON DESTRUCTIVE TESTING****Metallurgy And Material Technology****Time: 3 hours****Max Marks: 80****Answer any FIVE Questions****All Questions carry equal marks**

1. With suitable examples discuss the advantages, limitations and applications of ultrasonic testing of material. [16]
2. Discuss the principle, capabilities and limitations of MIVC technique. [16]
3. With a neat sketch discuss the Radiographic method of testing. [16]
4. Discuss the basic requirements needed for further development of Holography and Speckle technique. [16]
5. (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]
6. With a neat sketch, discuss the principle and operation of the holography NDT method. [16]
7. Write a short note on the following :
 - (a) Field sensitive probes.
 - (b) Measurement of metal properties. [8+8]
8. (a) What is Replica- Transfer - Coating (RTC)? Where it will be used? Discuss.
(b) What are the advantages of recording penetrant indications? [8+8]

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R07**Set No. 4****IV B.Tech I Semester Examinations, November 2010****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 salient features and advantages of thermal inspection?
(b) Describe different kinds of thermal inspection equipment. [6+10]
2. Derive an equation for the law of X-ray absorption $I = I_0 e^{(-\mu x)}$, and also discuss the significance of this law. [16]
3. Give some of the important applications which can be detected by Visual inspection methods of with optical aids and with out optical aids [16]
4. With a neat sketch discuss the design and operation of ultrasonic microscope. [16]
5. (a) Explain when and how circular and longitudinal magnetization methods are used?
(b) Explain the equipment, process and applications of Magnaflux inspection method. [6+10]
6. Discuss the penetrant flaw detection with the solvent removable process. [16]
7. Discuss the following:
(a) Cracks detection with Eddy currents.
(b) Metal sorting with Eddy currents. [8+8]
8. With a neat diagram, explain the Electromagnetic stress measurement by Magnetically Induced Velocity Changes (MIVC) for ultrasonic waves. [16]

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R07**Set No. 1****IV B.Tech I Semester Examinations, November 2010****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 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]
2. With a neat sketch discuss the principle and operations of Eddy current testing method. [16]
3. With a neat sketch discuss the design and working procedure of 0° compressional wave probes. [16]
4. Write a note on role of emulsifiers in the penetrant flaw detection? Give some of the common emulsifiers will be used in penetrant inspection. [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. Discuss in detail the methods available for Dynamic Inspection. [16]
7. With a neat diagram discuss the Barkhausen- Noise technique in detail. [16]
8. With a neat block diagram discuss the principle and operation of Acoustic Emission method. [16]

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R07**Set No. 3****IV B.Tech I Semester Examinations, November 2010****NON DESTRUCTIVE TESTING****Metallurgy And Material Technology****Time: 3 hours****Max Marks: 80****Answer any FIVE Questions****All Questions carry equal marks**

1. (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]
2. (a) What are the principal elements of a typical system for eddy current inspection of bar or tubing? Show with a neat diagram.
(b) What are the discontinuities detectable by eddy current inspection?
(c) What are reference samples? What are the major considerations in selecting reference discontinuities? [6+4+6]
3. (a) Explain basic principle of the acoustic emission method with a neat sketch.
(b) What are the benefits/ advantages of acoustic emission method?
(c) What are the requirements of acoustic emission instrumentation? [5+5+6]
4. (a) Discuss the fundamental points to be made for Optical Holography.
(b) Give important applications where dynamic inspection is needed. [8+8]
5. Discuss in detail of Electro Magnetic Acoustic Probes to generate ultrasonic waves. Discuss the advantages and applications of these methods. [16]
6. With a neat sketch, discuss the production of high energy X-ray by linear electron accelerators (Linacs). [16]
7. Mostly discontinuities in the materials can be seen visually but penetrant testing makes them much easier to detect. Justify the statement. [16]
8. Discuss critically the various methods used for generating magnetic fields. [16]
