

IV B.Tech I Semester Regular Examinations, November 2005

NDT METHODS

(Metallurgy & Material Technology)

Time: 3 hours

Max Marks: 80

**Answer any FIVE Questions
All Questions carry equal marks**

1. Explain about holography and its usage in NDT inspection. [16]
2. (a) What are penetrants? How these are used for flaw detection?
(b) Explain the principle of penetrant flaw detection. [8+8]
3. (a) Explain in detail about the safety measures to be taken from radiation.
(b) What are the limitations of Radiographical method? [12+4]
4. (a) Explain why special techniques are introduced in Ultrasonic testing method.
(b) Briefly explain some of the special techniques. [8+8]
5. (a) What is the principle of magnetic particle flaw detection?
(b) Describe the methods of magnetization. [12+4]
6. Discuss in detail the eddy current instruments used for inspection. [16]
7. Explain in detail the rigid coil technique of detecting the cracks in cylindrical specimens. [16]
8. (a) What is acoustic emission inspection?
(b) What is the basic principle of acoustic emission inspection?
(c) Explain the relationship of acoustic emission inspection with other test methods?

[4+4+8]

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1. Write short notes on the following:
 - (a) Fiberscopes
 - (b) Optical sensors
 - (c) Magnifying systems. [8+4+4]
2. (a) What are the materials used in penetrant inspection?
(b) Describe the process of penetrant inspection. [4+12]
3. (a) Explain in detail about the safety measures to be taken from radiation.
(b) What are the limitations of Radiographical method? [12+4]
4. (a) Explain how SAFT are used to detect the flaw with a neat diagram.
(b) What is a acoustic holography? [12+4]
5. (a) what is skin effect?
(b) How hysteresis loop is used for magnetic particle flaw detection?
(c) Describe magnetic flux density and intensity of magnetization. [4+8+4]
6. (a) In what way the principles of eddy current inspection and potential drop method differs?
(b) Discuss the advantages and limitations of eddy current inspection.
(c) List out the basic requirements in using eddy current inspection methods. [4+8+4]
7. Discuss the principles of hysteresis loop tests and comparator – bridge tests? What are the applications and limitations of electromagnetic testing methods? [16]
8. (a) What is acoustic emission inspection?
(b) What is the basic principle of acoustic emission inspection?
(c) Explain the relationship of acoustic emission inspection with other test methods? [4+4+8]

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1. Name some of the NDT methods. Briefly explain about each method with a kind of source used. [16]
2. (a) What are the types of penetrants and explain them in detail?
(b) Explain the conditions under which a type of penetrant can be used. [8+8]
3. (a) What is radiographic sensitivity?
(b) Discuss in detail about the Image Quality indicators. [8+8]
4. Explain how Bond testing and composite materials testing can be done by ultrasonics?

[16]
5. (a) What is the principle of magnetic particle flaw detection?
(b) Describe the methods of magnetization. [12+4]
6. (a) In what way the principles of eddy current inspection and potential drop method differs?
(b) Discuss the advantages and limitations of eddy current inspection.
(c) List out the basic requirements in using eddy current inspection methods. [4+8+4]
7. (a) Explain the importance of using a ferromagnetic material for electromagnetic testing.
(b) What are the different magnetization techniques used in detecting the flaws?
(c) What is the special feature of electromagnetic method over other NDT methods?

[8+4+4]
8. What are acoustic emission sensors? Explain one application of this sensor? [16]

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1. What is NDT? Discuss about the development of NDT and its important aims.
[16]
2. Explain with neat figures about the action of hydrophilic and lipophilic emulsifiers used for inspection purpose.
[16]
3. (a) What made the scientists to use Radio graphical methods for NDT?
(b) What is the principle of Radio graphical method?
(c) What are the sources used for NDT and briefly explain about the two major sources used for industrial applications.
[4+4+8]
4. Explain in detail with a neat sketch the principle of flaw detection by pulse echo method.
[16]
5. (a) what is skin effect?
(b) How hysteresis loop is used for magnetic particle flaw detection?
(c) Describe magnetic flux density and intensity of magnetization.
[4+8+4]
6. What are different operating variables encountered in eddy current inspection? Discuss them in detail.
[16]
7. (a) State Faraday's law of electromagnetic induction.
(b) Explain how the flux leakage can be used to find the defects in a specimen.
[4+12]
8. (a) What is the need of thermal inspection in NDT?
(b) What is the principle of thermal inspection?
(c) Briefly explain some of the material heat transfer characteristics.
[4+4+8]
