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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 72131

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Eighth Semester

Mechanical Engineering

ME 6019 — NON DESTRUCTIVE TESTING AND MATERIALS

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List out the service conditions that leads to failure of a material.

2. Name two of the NDT techniques methods that can be used to detect internal defects.

3. What is the effect of the size of the magnetic particles on the test performance in MPT?

4. Magnetic particle inspection cannot be used to detect internal defects. Why?

5. What is radio frequency mode in ultrasonic testing?

6. How does the depth of penetration of eddy current is affected by the frequency of the current?

7. What type of transducers is preferred for low ultrasonic frequencies?

8. Depth of penetration of ultrasonic waves decreases as the frequency ultrasonic wave increases. Comment.

9. How does computer tomography differs from other imaging techniques?

10. What are the advantages of pulse echo technique over transmission technique in UT?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Compare the destructive testing methods and non-destructive testing methods with respect to its advantages and limitations. (8)

(ii) With a case study, discuss the applications of visual inspection process. (8)

Or

(b) Discuss the various optical aids used in visual inspection techniques.

12. (a) (i) Discuss about the physical principles of liquid penetrant testing. (6)

(ii) Explain the post-emulsifiable lipophilic and solvent removable methods in liquid penetrant testing using process flow diagram. (10)

Or

(b) (i) Discuss about the various ways of magnetizing the component for MPT. (12)

(ii) Write the limitations of magnetic particle testing. (4)

13. (a) (i) Explain the principle of Eddy current testing with neat diagram. (6)

(ii) Discuss about the various types of coils used for Eddy current inspection. (10)

Or

(b) Discuss the principle of acoustic emission technique and the various parameters involved in the testing process.

14. (a) (i) Describe the various types of ultrasonic waves on the basis of the mode of particle displacement. (12)

(ii) Discuss about the various ways of data interpretation in UT. (4)

Or

(b) Explain the pulse echo and through transmission technique in UT with neat sketches.

15. (a) (i) Explain the principles of radiography testing with neat diagram. (10)

(ii) Discuss about the image conversion media in radiography. (6)

Or

(b) What are the four possible interactions between a photon (quantum) of electromagnetic radiation and material? Explain.

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