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Question Paper Code : X10690

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020
AND APRIL/MAY 2021

Seventh/Eighth Semester

Mechanical Engineering (Sandwich)

ME 8097 – NON DESTRUCTIVE TESTING AND EVALUATION

(Common to Production Engineering, Aeronautical Engineering,
Manufacturing Engineering/Mechanical Engineering)

(Regulations 2017)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A

(10×2=20 Marks)

1. Visual inspection process often provides an useful supplement in Non-Destructive Inspection process. Comment.
2. What are the different ways of achieving the optical connections in Borescopes ?
3. What are the factors that determine the ability of a liquid to flow over the surface and enter into cavities ?
4. In what way the magnetic printing differs from Conventional Magnetic particle inspection process ?
5. What is the effect of conductivity and frequency on coil impedance ?
6. What is the influence of emissivity in thermal Inspection process ?
7. The second reflection will produce peaks similar to the first set of backwall peaks but of reduced intensity. Give reasons.
8. What are the requisite characteristics of an Acoustic emission Sensor ?
9. Only X-rays and gamma rays have the capability of penetrating opaque materials to reveal internal flaws. Why ?
10. How does the quality of radiographic films be ensured ?



PART – B

(5×13=65 Marks)

11. a) i) With the help of a neat diagram, explain computer enhanced visual inspection system. (6)
- ii) Briefly explain the different types of borescopes used in visual inspection. (7)

(OR)

- b) Compare and contrast the Destructive testing methods with that of Non-Destructive testing methods with examples.

12. a) i) Discuss about the various ways of magnetizing the component for MPT. (10)
- ii) Write down the limitations of Magnetic Particle Testing. (3)

(OR)

- b) Explain with diagrams the functioning of Lipophilic and Hydrophilic Emulsifiers in Liquid penetrant inspection process.

13. a) Discuss in detail the different types of Thermography inspection methods.

(OR)

- b) Explain the Eddy current inspection process for detecting a crack in a flat specimen using surface deflection coil.

14. a) i) List the basic equipments in Ultrasonic Inspection Process. (3)
- ii) Explain about the typical designs of test blocks that are used as reference standards for Straight Beam inspection and Angle Beam inspection in UT. (10)

(OR)

- b) i) What is the significance of Sensors and preamplifiers in Acoustic Emission technique? (4)
- ii) Explain the different types of Sensors and preamplifiers that are used in AE Inspection process. (9)



15. a) Draw a schematic of the basic elements of a Radiographic system showing the method of sensing the image of an internal flaw in a plate of uniform thickness and explain.

(OR)

- b) i) What is the basic Technique involved in Computed Tomography ? (3)
ii) Draw a schematic representation of a Computed Tomography Process and explain the method of construction of CT image. (10)

PART – C

(1×15=15 Marks)

16. a) Compare the applicability of the various Non-Destructive Evaluation methods to flaw detection in Powder Metallurgy parts.

(OR)

- b) Geometric weld discontinuities are one of the common problems associated with welded structures. Suggest a suitable NDT technique to detect the various geometric discontinuities in welds and explain the process with diagrams.
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