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Question Paper Code : 90850

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022

Seventh/Eighth Semester

Mechanical Engineering

ME 8097 – NON DESTRUCTIVE TESTING AND EVALUATION

(Common to : Aeronautical Engineering/Manufacturing Engineering/Mechanical Engineering (Sandwich)/Production Engineering)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish between NDT and mechanical testing of materials.
2. List few areas in a foundry where NDT find applications.
3. Mention the role of developers in Liquid penetrant testing.
4. Suggest a method of rapid inspection of mass produced ferromagnetic components.
5. List few limitations of infrared thermography.
6. Mention a reason that makes eddy current testing versatile form of non destructive evaluation.
7. Write notes on pulse-echo mode of ultrasonic testing.
8. What is the main difference between ultrasonic testing and acoustic emission testing?
9. What is the major difference between continuous radiation and characteristic radiation?
10. What is zero radiography?

PART B — (5 × 13 = 65 marks)

11. (a) Present an overview of Non-destructive testing methods for the detection of various types of defects in industries. (13)
Or
(b) Explain the uses of various optical aids for visual inspection stating their applications in various fields. (13)
12. (a) Explain the steps involved in Liquid penetrant testing with neat sketches. (13)
Or
(b) Describe the procedure for Magnetic particle testing with suitable diagrams. (13)
13. (a) Explain the instrumentation of eddy current testing and the cases that suit its applications. (13)
Or
(b) Discuss various industrial scenario that demands thermography for its inspection. (13)
14. (a) Explain the methods of ultrasonic testing with suitable sketches. (13)
Or
(b) (i) Explain the applications of A-scan, B-scan and C-scans of Ultrasonic testing. (8)
(ii) Describe the architecture of an Ultrasonic probe with an illustrative diagram. (5)
15. (a) Explain the production of X-rays with the help of a figure illustrating the basic construction of an X-ray equipment.
Or
(b) (i) Describe the setup for Fluoroscopy mentioning its applications. (8)
(ii) Write detailed notes on computed tomography. (5)

PART C — (1 × 15 = 15 marks)

16. (a) Discuss the applications of Eddy current testing in Ship industries and aircraft maintenance.
Or
(b) The tank and pipelines of an oil refinery needs to be periodically inspected. The inspection is generally carried out online. Suggest suitable methods of inspecting the tanks and pipelines for various types of defects.

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Question Paper Code : 91077

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

Seventh/Ninth Semester

Aeronautical Engineering

OML 751 – TESTING OF MATERIALS

(Common to: Aerospace Engineering/ Automobile Engineering/Civil Engineering/Electrical and Electronics Engineering/Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Electronics and Telecommunication Engineering/Industrial Engineering/ Industrial Engineering and Management/Instrumentation and control Engineering/Manufacturing Engineering/Marine Engineering/Mechanical Engineering/ Mechanical Engineering (Sandwich)/Mechatronics Engineering/Petrochemical Engineering/Production Engineering/Robotics and Automation/Bio Technology/Chemical Engineering/Chemical and Electrochemical Engineering/Food Technology/Petrochemical Technology/Petroleum Engineering/Pharmaceutical Technology)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the factors to be considered during selection of materials for testing?
2. Why development of testing is necessary?
3. Neatly draw the stress-strain curve for a ductile material.
4. What is the principle involved in fatigue testing?
5. Differentiate between non-destructive testing and destructive testing.
6. State any two applications of creep test.
7. Differentiate between optical and electron microscope.
8. List the various electrical techniques available for material testing.
9. What is the principle of Differential Thermal Analysis?
10. State the principle of X-Ray fluorescence.

PART B — (5 × 13 = 65 marks)

11. (a) Discuss the classification of various material testing.
Or
(b) Describe the different testing organizations, its committee and the standards followed.
12. (a) Explain the principle, experimental method, advantages and limitations of Charpy test.
Or
(b) Sketch the various types of fatigue cycles. Describe the methodology followed during fatigue test. How is S-N curve constructed? Explain the significance of endurance limit.
13. (a) Explain the testing procedure for liquid penetrant inspection with suitable sketch.
Or
(b) Briefly explain about the working principle, advantages, limitations and applications of Ultrasonic testing.
14. (a) Discuss the principle, construction, working and applications of scanning electron microscope.
Or
(b) Explain any one of the diffraction and spectroscopic characterization technique with their advantages.
15. (a) Explain differential scanning calorimetry with working principle and write its applications.
Or
(b) Explain the principle and methodology of inductively coupled mass spectrometry used for determining elemental composition.

PART C — (1 × 15 = 15 marks)

16. (a) Compare and contrast Vickers, Brinell and Rockwell hardness tests.
Or
(b) Explain the procedure of electrical and magnetic technique used in industries to characterize materials.