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

Question Paper Code : 41573

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2024.

Seventh Semester

Civil Engineering

OML 351 – INTRODUCTION TO NON-DESTRUCTIVE TESTING

(Common to: Aeronautical Engineering / Aerospace Engineering / Automobile Engineering / Biomedical Engineering / Computer Science and Design / Computer Science and Engineering / Computer Science and Engineering (Artificial Intelligence and Machine Learning) / Computer Science and Engineering (Cyber Security) / Computer and Communication Engineering / Electrical and Electronics Engineering / Electronics and Communication Engineering / Electronics and Instrumentation Engineering / Electronics and Telecommunication Engineering / Environmental Engineering / Geoinformatics Engineering / Industrial Engineering / Industrial Engineering and Management / Instrumentation and Control Engineering / Manufacturing Engineering / Marine Engineering / Mechanical Engineering / Mechanical and Automation Engineering / Mechatronics Engineering / Medical Electronics / Petrochemical Engineering / Production Engineering / Robotics and Automation / Safety and Fire Engineering / Agricultural Engineering / Artificial Intelligence and Data Science / Bio Technology / Biotechnology and Biochemical Engineering / Chemical Engineering / Computer Science and Business Systems / Fashion Technology / Food Technology / Handloom and Textile Technology / Information Technology / Petrochemical Technology / Petroleum Engineering / Pharmaceutical Technology / Textile Chemistry / Textile Technology

(Regulations 2021)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Mention the objectives of non-destructive testing.

2. Name the list of optical aids used for visual inspection.

3. Define the terms "Dwell time and Developing time".

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

5. Point out two conditions of in-applicabilility of thermography.

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

7. List the factors influencing acoustic wave propagation.

8. What are the factors to be considered in selection of transducer?

9. Classify filters in radiographic testing.

10. Differentiate film and film less X-Ray techniques.

PART B — (5 × 13 = 65 marks)

11. (a) Illustrate the working principle and types of visual inspection technique with suitable sketch.

Or

(b) Summarize the principles of various non-destructive methods which are used to detect the material defects. State the advantage of any two NDT method.

12. (a) Explain the following

(i) Principal requirements of penetrants. (7)

(ii) Properties of penetrants. (6)

Or

(b) Explain with suitable sketch about following

(i) Circular Magnetization. (7)

(ii) Longitudinal Magnetization. (6)

Or

13. (a) List and explain in detail about the laws of thermal imaging in Thermography test.

Or

(b) Explain the different types of method used for generation of magnetic field in eddy current testing.

14. (a) Illustrate the principle of pulse echo method with neat sketch in ultrasonic testing method.

Or

(b) Discuss the following with suitable diagram

(i) Transient signal in AE. (7)

(ii) Continuous signals in AE. (6)

15. (a) Describe radiographic imaging techniques with suitable sketch.

Or

(b) Explain the various stages of film processing and development with flow diagram.

PART C — (1 × 15 = 15 marks)

16. (a) Nickel based super alloy for the aerospace application is welded using TIG welding process. The weldment has surface and sub surface defects. Apply your knowledge how to detect the defects in the weldment surface and sub-surface.

Or

(b) Explain about various parameters involved in Acoustic Emission Testing method of non-destructive testing.

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