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Question Paper Code : 91583

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2025.

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 Engineering/ Artificial Intelligence and Data Science/Biotechnology/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. Name two of the NDT techniques that can be used to detect internal defects of the materials.
2. Discriminate aided and unaided visual testing methods.
3. Compare fluorescent penetrant and visible penetrant.
4. Magnetic particle inspection cannot be used to detect internal defects. Why?

5. State the basic principle involved in thermography testing.
6. How the depth of penetration of eddy current is affected by the frequency of the current?
7. Define attenuation and acoustic impedance.
8. Define transducer and list the types of ultrasonic transducer.
9. What is isotope decay rate in gamma ray testing?
10. How x-ray radiography differs from film radiography?

PART B — (5 × 13 = 65 marks)

11. (a) Discuss the different types of borescopes used in visual inspection with clear sketches.

Or

- (b) Compare and contrast the principles, characteristics detected, advantages, limitations and applications of eddy current testing, acoustic emission testing and radiography testing methods.

12. (a) (i) List the main factors to be considered for penetrant fill in the flaws of materials. (7)
- (ii) Describe health and safety precautions in LPT. (6)

Or

- (b) List and explain the steps involved for inspecting crankshafts by wet article magnetic particle inspection method.

13. (a) (i) Explain the procedure for thermography testing of electrical panels. (7)
- (ii) List the factors identified by thermal testing method of NDT. (6)

Or

- (b) Evaluate the procedure for detecting fatigue crack in the materials by eddy current inspection technique.

14. (a) Explain about various parameters involved in Acoustic Emission Testing method of Non-destructive testing.

Or

- (b) Describe in detail about which method of Ultrasonic inspection technique is suitable for inspect the casting of materials with neat sketch.

15. (a) Explain the types of radiation produced by radioactive decay (gamma ray) and their application with neat sketch.

Or

- (b) Classify X-ray films used in industrial radiography and brief about construction of film with simple line diagram.

PART C — (1 × 15 = 15 marks)

16. (a) Present a case study on NDT applications in defence systems.

Or

- (b) Narrate a case study of phased array ultrasound in medical applications.
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