

Register No.: ..... Name: .....

## **SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)**

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

**SEVENTH SEMESTER B.TECH DEGREE EXAMINATION (S), FEBRUARY 2024**

**MECHANICAL ENGINEERING**

**(2020 SCHEME)**

**Course Code : 20MET411**

**Course Name: Advanced Methods in Non-destructive Testing**

**Max. Marks : 100**

**Duration: 3 Hours**

### **PART A**

***(Answer all questions. Each question carries 3 marks)***

1. Enumerate the applications of eddy current NDT.
2. Discuss the different types of developers used in Liquid Penetrant Inspection.
3. Compare contact and immersion ultrasonic testing methods. Use figures.
4. Briefly describe the working principle of laser Shearography.
5. Explain the significance of image quality indicators in Radiography testing.
6. List any 3 types of radiographic inspection techniques with neat figures.
7. Discuss any three types of phased array transducer probes and their elemental patterns.
8. What is SAFT in NDT?
9. Explain the working principle of Acoustic Emission testing.
10. Describe any three applications of leak testing.

### **PART B**

***(Answer one full question from each module, each question carries 14 marks)***

#### **MODULE I**

11. Elaborate 4 magnetization techniques used in MPI with neat figures. (14)

**OR**

12. Describe the principle of LPI and the stages involved, using neat figures. (14)

#### **MODULE II**

13. Describe the working principle and features of Laser Ultrasonics. (14)

**OR**

14. Compare with applications the types of ultrasonic inspection techniques used. (14)

**MODULE III**

15. Discuss the working principle of radiographic NDT and list the safety precautions to be followed for the inspection. (14)

**OR**

16. Describe the concept of neutron radiography and list 6 engineering applications of the process. (14)

**MODULE IV**

17. Explain in detail the concept and working principle of time-of-flight diffraction (TOFD) inspection with neat sketches. (14)

**OR**

18. List the objectives of Structural Health Monitoring. With the help of a case study, justify the importance of SHM in modern engineering applications. (14)

**MODULE V**

19. Explain the working principle of leak testing and compare overpressure method with vacuum method. (14)

**OR**

20. An NDT expert needs to assess the integrity of critical infrastructure components, such as electrical circuits, without causing damage or disruption, and ensure the early detection of faults/defects in a non-invasive and efficient manner. Suggest a suitable inspection method and justify your answer. (14)

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