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

Question Paper Code : 80904

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2024.

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. List out the service conditions that leads to failure of a material.

2. What is the use of an optical flat in visual inspection?

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

4. Component tested by Magnetic particle testing has to be demagnetized before put into service, Why?

5. What is the effect of frequency of current on the depth of penetration Eddy current testing?

6. What is the principle for Thermography testing?

7. Name any two materials used for ultrasonic transducers.

8. Depth of penetration of Ultrasonic waves decreases as the frequency of ultrasonic wave increases-Comment.

9. What do you mean by Rayleigh effect?

10. Distinguish between photographic emulsion film and fluorescent screen in Radiography testing.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the various factors that influence the selection of an appropriate NDT method for particular applications. (13)

Or

(b) Explain in detail the various mechanical aids used in visual inspection technique.

12. (a) (i) What are the characteristics of developers? (3)

(ii) Explain in detail the post-emulsifiable lipophilic technique with neat flow diagram. (10)

Or

(b) (i) What is the principle of Magnetic Particle Testing? (3)

(ii) Discuss in detail the different magnetization methods with neat sketch. (10)

13. (a) Draw the Block diagram of a Thermography system and explain the testing process.

Or

(b) (i) Explain the influence of various parameters on the depth of penetration in Eddy current testing. (3)

(ii) Discuss in detail on the instrumentation involved in the Eddy current testing. (10)

14. (a) Describe the Experimental setup of Acoustic Emission testing.

Or

(b) What are the different modes of display or data presentation in Ultrasonic Testing? Explain.

15. (a) Discuss in detail the four possible interactions between a photon (quantum) of electromagnetic radiation and material? Explain.

Or

(b) Discuss the factors that can affect the quality of radiographic images and how these factors can be minimized during testing.

PART C — (1 × 15 = 15 marks)

16. (a) Discuss in detail about how the fibre volume fraction can be measured by Eddy current technique.

Or

(b) How do the following can be measured by Ultrasonic technique?

(i) the grain size and (7)

(ii) thickness of a component (8)