



Reg. No. :

--	--	--	--	--	--	--	--	--	--	--	--	--	--

Question Paper Code : 91831

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Eighth Semester

Mechanical Engineering

ME 6019 – NON DESTRUCTIVE TESTING AND MATERIALS

(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A

(10×2=20 Marks)

1. How is Non-Destructive Testing different from Destructive testing ?
2. What are the two types of Flexible borescopes used in Visual inspection process ?
3. What are the limitations of permanent-magnet yokes ?
4. How are fluorescent penetrants classified based on the sensitivity level ?
5. Name the two commonly used inspection coils in Eddy current testing.
6. Enumerate the material characteristics that affect conduction and convection in Heat transfer.
7. What are Lamb Waves ?
8. How does Acoustic emission differ from other nondestructive testing methods ?
9. In what way Real time Radiography differ from Film Radiography ?
10. What are the three main advantages of Radiographic Inspection process ?



PART - B

(5×13=65 Marks)

11. a) Discuss in detail on any two magnifying systems that are in used visual inspection.
- (OR)
- b) State the various NDE methods and write down their important characteristics.
12. a) i) List the four main types of Liquid Penetrant Testing methods. (3)
 ii) Describe the different steps involved in Liquid Penetrant inspection process. (10)
- (OR)
- b) How are central conductors used for the circular magnetization of long, hollow cylindrical parts ? Explain.
13. a) i) Enumerate the principal operating variables that are encountered in eddy current inspection. (3)
 ii) Discuss on the above variables in brief. (10)
- (OR)
- b) Discuss in detail the various equipments used in Thermal Inspection processes.
14. a) i) Explain the basic principle of Acoustic Emission method with a neat schematic diagram. (7)
 ii) Compare the characteristics of Acoustic Emission technique with other NDT. (6)
- (OR)
- b) What are the basic properties of ultrasonic waves ? Describe the two main ultrasonic techniques.
15. a) Discuss in detail the basic principle of Computed Tomography with a neat diagram.
- (OR)
- b) i) What are three important electrical characteristics of x-ray tubes ? (3)
 ii) Discuss on the effect of the above characteristics on the efficiency of energy conversion in X-ray production. (10)

PART - C

(1×15=15 Marks)

16. a) The strength, direction, and distribution of magnetic fields are greatly affected by the type of current used for magnetization – Justify the statement with detailed discussion on the types of current used in Magnetic particle inspection.
- (OR)
- b) With a case study, discuss on the inspection process of Liquid Penetrant testing in conjunction with another non-destructive method.