Code No: **R204103Q** **R20** **Set No. 1**

IV B.Tech I Semester Regular Examinations, January– 2024

NON DESTRUCTIVE EVALUATION

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks

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UNIT - I

1 a) Discuss the parameters for the failure of the material and explain the importance of application of NDT techniques to detect the failure of the material. [7]

b) Differentiate between destructive and non-destructive testing. [7]

(OR)

2 a) Explain the applications of Visual inspection and Advantage and disadvantage of Visual inspection. [7]

b) Discuss the working principle involved in the neutron ray radiography. [7]

UNIT - II

3 Illustrate with neat sketches the working of ultrasonic transducers used in the Ultrasonic testing method. [14]

(OR)

4 a) Discuss with neat sketch the data presentation techniques used in Ultrasonic non-destructive testing. [7]

b) Discuss about the time of flight diffraction and phased array techniques of ultrasonic testing with neat figures? [7]

UNIT - III

5 a) Discuss the physical principles involved in liquid penetrant testing with neat diagram. [7]

b) Explain the eddy current NDT method used to analyze the flaws in pipe fittings. [7]

(OR)

6 a) Discuss the advantages and limitations of liquid penetrant testing. [7]

b) Write short notes on the following
i) Inductance ii) Induction iii) Inductive reactance [7]

UNIT - IV

7 a) Discuss about the importance of residual magnetism in magnetic particle testing. [7]

b) Differentiate the longitudinal and circumferential magnetism produced in the magnetic particle testing. [7]

(OR)

8 Explain about dry and wet magnetic particle inspection techniques with neat diagram. [14]

UNIT - V

9 a) Discuss the characteristics of coating material used in the thermography. [7]

b) Describe the applications of IR imaging in the aerospace applications. [7]

(OR)

10 Classify infrared sensors and explain any two sensors with neat sketch about working principles of IR sensors. [14]

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Code No: **R204103Q** **R20** **Set No. 2**

IV B.Tech I Semester Regular Examinations, January– 2024

NON DESTRUCTIVE EVALUATION

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks
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UNIT - I

1	a)	Briefly explain the sources of X rays and Gamma rays.	[7]
	b)	Discuss the factors influencing the selection of NDT techniques.	[7]
		(OR)	
2		Differentiate the principles, characteristics detected, advantages, limitations of eddy current testing and ultrasonic testing in automotive industries.	[14]

UNIT - II

3	a)	Describe the working of Electromagnetic acoustic transducer with neat sketch.	[7]
	b)	Discuss the differences transmission and pulse echo methods used in Ultrasonic testing method.	[7]
		(OR)	
4	a)	Discuss the variables that are affecting the results in ultrasonic testing.	[7]
	b)	Explain the operating principle involved in the ultrasonic testing with neat sketch.	[7]

UNIT - III

5	a)	Describe in detail about types of developers used in LPT.	[7]
	b)	Describe the Hall effect sensors in eddy current testing with neat sketch.	[7]
		(OR)	
6	a)	Illustrate with neat sketching about the principle of liquid penetrant testing.	[7]
	b)	Discuss the concepts of magnetization and demagnetization used in the eddy current testing.	[7]

UNIT - IV

7		Explain with suitable sketch about following. (i) Magnetization of irregular parts (ii) Demagnetization	[14]
		(OR)	
8	a)	Discuss the advantages and limitations of magnetic particle testing.	[7]
	b)	Discuss the methods used to magnetize the materials in MPT.	[7]

UNIT - V

9	a)	Explain the principles of thermography testing used in passive approach and also list out its applications.	[7]
	b)	Discuss the characteristics of infrared waves.	[7]
		(OR)	
10		Explain in detail the image processing involved in thermography.	[14]

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Code No: **R204103Q** **R20** **Set No. 3**

IV B.Tech I Semester Regular Examinations, January– 2024

NON DESTRUCTIVE EVALUATION

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks
*****

UNIT - I

1		Differentiate the principles, characteristics detected, advantages, limitations of magnetic particle testing and liquid penetrating testing in the railways.	[14]
		(OR)	
2	a)	Explain the methods for the production of X-rays.	[7]
	b)	Discuss the advantages and disadvantages of radiographic testing.	[7]

UNIT - II

3	a)	Discuss the various applications of ultrasonic testing.	[7]
	b)	Describe the Angle beam ultrasonic inspection method with neat sketch.	[7]
		(OR)	
4		Discuss about the following phenomena with neat sketch. (a) A-scan (b) B-scan (c) C-scan	[14]

UNIT - III

5	a)	Explain the different types of penetrants used in the liquid penetrant testing.	[7]
	b)	Discuss the various applications of eddy current non destructive testing.	[7]
		(OR)	
6	a)	Discuss the characteristics of developers used in liquid penetrant testing.	[7]
	b)	Discuss about the various types of coils used for Eddy current inspection.	[7]

UNIT - IV

7		Explain the following with suitable sketch (i) Circular Magnetization (ii) Longitudinal Magnetization.	[14]
		(OR)	
8	a)	Discuss in detail the applications of Magnetic particle inspection process.	[7]
	b)	Explain the properties required for magnetic particles used in the Magnetic particle testing.	[7]

UNIT - V

9		Discuss the Contact and Non-Contact inspection methods in Thermography with suitable diagrams.	[14]
		(OR)	
10	a)	Explain the principles of thermography testing used in active approach and also list out its applications.	[7]
	b)	Discuss the liquid crystal thermography with neat sketch.	[7]

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Code No: **R204103Q** **R20** **Set No. 4**

IV B.Tech I Semester Regular Examinations, January– 2024

NON DESTRUCTIVE EVALUATION

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks
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UNIT - I

1 a) Discuss the application of NDE techniques in the detection of detectives in the pressure vessels. [7]
b) Explain the working principle involved in the radiographic testing with neat sketch. [7]

(OR)

2 a) Discuss the safety measures to be adopted in the radiographic testing. [7]
b) Discuss the safety aspects of industrial radiography. [7]

UNIT - II

3 a) Explain the principle of ultrasonic testing with the neat sketch. [7]
b) Mention the advantages and disadvantages of ultrasonic testing. [7]

(OR)

4 a) Describe the working of Piezo-Electric transducer with neat sketch. [7]
b) Elucidate the Straight beam ultrasonic inspection method with neat sketch. [7]

UNIT - III

5 a) Explain the solvent removable methods in liquid penetrant testing using process flow diagram. [7]
b) Discuss the principle requirements of penetrants used in the LPT. [7]

(OR)

6 Explain the different types of methods used for generation of magnetic field in eddy current testing. [14]

UNIT - IV

7 Discuss the following magnetization equipment used in the MPT
i) Permanent Magnet ii) Electromagnetic yokes iii) Prods [14]

(OR)

8 a) Explain about various steps involved in Magnetic particle inspection process with suitable flow diagram. [7]
b) List and explain the steps involved in inspecting crankshafts using the wet particle magnetic particle inspection method. [7]

UNIT - V

9 a) Discuss in detail about the elements of infrared detection system with a block diagram. [7]
b) Discuss the characteristics of infrared sensors used in thermography test. [7]

(OR)

10 Describe in detail about the laws of thermal imaging in Thermography test. [14]

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