

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI EXAMINATION – SUMMER 2025

**Subject Code:3161923**

**Date:30-05-2025**

**Subject Name: Non destructive Testing**

**Time:10:30 AM TO 01:00 PM**

**Total Marks:70**

**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Differentiate Destructive Testing and Non Destructive Testing. **03**  
(b) Highlight the use of Borescope in visual testing. **04**  
(c) State principle of liquid penetrant testing (LPT) and with neat sketch explain different steps of LPT. **07**
- Q.2** (a) Briefly give application and limitations of Visual Testing. **03**  
(b) Write note on piezoelectricity **04**  
(c) Draw neat sketch of Normal, TR and Angle probes and standard test block used for ultrasonic testing. **07**
- OR**
- (c) Explain UT A-scan, B-scan and C-scan. **07**
- Q.3** (a) Explain principle of radiography **03**  
(b) Write note on eddy current testing. **04**  
(c) How the pulse-echo method of ultrasonic inspection is carried out? State the advantages and disadvantages of pulse echo method. **07**
- OR**
- Q.3** (a) Difference between the fluorescent and visible penetrants. **03**  
(b) What are the advantages and limitations of thermography testing? **04**  
(c) Explain in brief the leak testing of heat exchanger tubes in a boiler. **07**
- Q.4** (a) Explain different type of magnetic particles used in MPT. **03**  
(b) What is leak testing? What are the methods of leak testing? **04**  
(c) Explain principle of leak testing and discuss Helium leak detection techniques with neat sketch. **07**
- OR**
- Q.4** (a) List out properties of X-rays and Gamma rays. **03**  
(b) What are different types of sound waves? Explain. **04**  
(c) Explain near zone, far zone and transition zone in UT. **07**
- Q.5** (a) What is leak and its different types? **03**  
(b) Give salient features of acoustic emission technique. **04**  
(c) Explain in brief about pressure decay and vacuum decay leak testing. **07**
- OR**
- Q.5** (a) State safety precaution in Industrial radiography. **03**  
(b) List out factors influencing the selection of ultrasonic transducer. Classify ultrasonic transducers. **04**  
(c) Explain the different methods of penetrant application? **07**

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**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2024****Subject Code:3161923****Date:24-05-2024****Subject Name:Non destructive Testing****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
<b>Q.1</b>	(a) List the names of all Destructive & Non-destructive testing commonly carried out.	<b>03</b>
	(b) Discuss principle of visual testing and its limitations.	<b>04</b>
	(c) What are the types of transducers are used in UT.? Explain with suitable diagram.	<b>07</b>
<b>Q.2</b>	(a) What is contact angle, capillary action and dwelling time in LPT.	<b>03</b>
	(b) Give the applications and limitations of LPT.	<b>04</b>
	(c) List out and discuss briefly different MPT equipment.	<b>07</b>
	<b>OR</b>	
	(c) Explain procedure of Magnetic particle testing.	<b>07</b>
<b>Q.3</b>	(a) Which are the different types of sound waves? Explain	<b>03</b>
	(b) Write a brief note on (a) Penetrants (b) developers.	<b>04</b>
	(c) Explain the principle of Acoustic Emission Testing (AET) with line diagram. Write applications & advantages of AET.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Why and how demagnetization is carried out?	<b>03</b>
	(b) Discuss defects due to the forging process & Heat treatment process.	<b>04</b>
	(c) Explain pulse echo method with neat sketch.	<b>07</b>
<b>Q.4</b>	(a) Discuss advantages and limitations of X-ray radiography.	<b>03</b>
	(b) Explain basic principle of Radiographic examination.	<b>04</b>
	(c) Differentiate between X-ray & Gamma-ray radiographic testing.	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) List the advantages and limitations of UT.	<b>03</b>
	(b) What is the use of penetrometer in RT.	<b>04</b>
	(c) What is A Scan- B Scan- C Scan presentation in ultrasonic testing?	<b>07</b>
<b>Q.5</b>	(a) What do you understand by sensitivity in ECT?	<b>03</b>
	(b) Write note on piezoelectricity.	<b>04</b>
	(c) Explain Leak and Pressure testing techniques. What are its applications?	<b>07</b>
	<b>OR</b>	
<b>Q.5</b>	(a) State safety precaution in Industrial radiography.	<b>03</b>
	(b) Explain X Ray film processing	<b>04</b>
	(c) What is the principle of Thermographic Testing? What are its limitations & advantages.?	<b>07</b>

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**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2023****Subject Code:3161923****Date:14-07-2023****Subject Name:Non destructive Testing****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		<b>MARKS</b>
<b>Q.1</b>	(a) State the objectives of Non Destructive Testing	<b>03</b>
	(b) Define developer. Describe standard forms of developers used in dye penetrant testing (DPT).	<b>04</b>
	(c) Enlist different tools used in Visual Inspection and explain constructional working of borescope used in visual inspection with neat sketch.	<b>07</b>
<b>Q.2</b>	(a) List the advantages and disadvantages of Magnetic Particle testing (MPT).	<b>03</b>
	(b) Discuss factors affecting the Eddy current testing (ECT).	<b>04</b>
	(c) Explain pulse echo technique for Ultrasonic testing (UT) method with neat diagram.	<b>07</b>
	<b>OR</b>	
	(c) Explain the principle of Dye penetrant testing (DPT). Clearly mention the application for same.	<b>07</b>
<b>Q.3</b>	(a) Write short note on radiographic film used in Radiographic testing (RT) with neat sketch.	<b>03</b>
	(b) Explain any four factors influencing acoustic wave on propagation and data acquisition in acoustic emission testing (AET).	<b>04</b>
	(c) Explain straight beam and angle beam testing techniques used in ultrasonic testing (UT).	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Define terms related to dye penetrant testing (DPT). 1) Capillary action 2) Dwell time 3) contact angel	<b>03</b>
	(b) Explain indirect magnetization method in magnetic particle testing (MPT).	<b>04</b>
	(c) Explain use of ultrasonic testing (UT) in field of welding With types of defects that can be detected during the same.	<b>07</b>
<b>Q.4</b>	(a) Enlist the properties of X-ray and Gamma Rays	<b>03</b>
	(b) Explain safety precautions to be taken during Radiographic testing (RT).	<b>04</b>
	(c) Explain the working of piezoelectric transducer with a neat sketch with its advantages and disadvantages.	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) How the quality of a good radiograph is accessed?	<b>03</b>
	(b) Explain any two methods of coupling in ultrasonic testing (UT).	<b>04</b>

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|------------|-----|--|-----------|
|            | (c) | With suitable diagram explain the process of radiography testing (RT) using Cobalt 60 isotope. | <b>07</b> |
| <b>Q.5</b> | (a) | What are the prime advantages of Radiographic Examination during NDT?                          | <b>03</b> |
|            | (b) | Explain the principle of Ultrasonic Testing (UT).  | <b>04</b> |
|            | (c) | Discuss different techniques for Thermography with its application.                            | <b>07</b> |
|            |     | <b>OR</b>  |           |
| <b>Q.5</b> | (a) | What do you mean by leak testing? Enlist different methods that can be used for leak testing.  | <b>03</b> |
|            | (b) | Describe the advantages and limitations of Eddy current testing (ECT)?                         | <b>04</b> |
|            | (c) | Explain SWSI and DWSI inspection techniques in radiographic testing (RT).                      | <b>07</b> |

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**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2022****Subject Code:3161923****Date:10/06/2022****Subject Name:Non destructive Testing****Time:10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Give the names of all destructive and non-destructive testing commonly carried out. **03**  
(b) List the typical characteristics of penetrant and developer in LPT. **04**  
(c) What is visual examination? Explain visual examination method using borescope. **07**

- Q.2** (a) Why and how demagnetization is carried out? **03**  
(b) Discuss advantages and limitations of eddy current testing. **04**  
(c) State principle of liquid penetrant testing (LPT) and with neat sketch explains different steps of LPT. **07**

**OR**

- (c) What is couplant in ultrasonic testing? What is its role? State its advantages and disadvantages. **07**

- Q.3** (a) What is contact angle, capillary action and dwelling time in LPT? **03**  
(b) Explain principle of magnetic particle testing and its limitations. **04**  
(c) With the help of a diagram explain the Pulse echo technique of Ultrasonic testing. **07**

**OR**

- Q.3** (a) List out properties of X-rays and Gamma rays. **03**  
(b) Give salient features of acoustic emission technique. **04**  
(c) Which method is best suited for institute inspection of a pipe line of a refinery? Why? **07**

- Q.4** (a) Discuss advantages and limitations of X-ray radiography. **03**  
(b) What is the use of penetrometer in radiographic testing? **04**  
(c) Explain ultrasonic testing (UT) A-scan, B-scan and C-scan. **07**

**OR**

- Q.4** (a) State safety precaution in Industrial radiography. **03**  
(b) What are different types of sound waves? Explain. **04**  
(c) Discuss the use of radiography testing (RT) in the field of welding. Draw and explain the types of defects that can be observed during the same. **07**

- Q.5** (a) Define geometric unsharpness ( $U_g$ ) and write note on radiographic film. **03**  
(b) Compare advantages and limitation of ultrasonic and radiography testing. **04**  
(c) Discuss techniques and applications of thermography. **07**

**OR**

- Q.5** (a) What is leak and its different types? **03**  
(b) Explain principle of eddy current testing (ECT). **04**  
(c) Explain in brief the leak testing of heat exchanger tubes in a boiler. **07**

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