Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE(MINOR)- SEMESTER–I&II EXAMINATION – SUMMER 2025

Subject Code:N114AR01 Date:03-06-2025

Subject Name:NDT Techniques - I (VI, LPT, MPT)

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
Q.1	**(a)**	What is the scope of non destructive testing in 21st century?	**03**
	(b)	List the NDT methods with their prime importance in the industry.	**04**
	(c)	Define the terms defect and discontinuity. With neat sketch illustrate the welding defects and write any remedies for any two defects.	**07**
Q.2	**(a)**	What are the possible reasons to reject the product? By which means evaluator/inspector decides that whether component having non-conformity is acceptable or not?	**03**
	(b)	What are the visual aids to be used for inspecting component by VT?	**04**
	(c)	Which visual aid is used to inspect inside edge of steel pipe? Explain about its function and working principle with neat sketch.	**07**
		OR	
	(c)	What are the types of measuring and transferring instruments and welding gauges are used in visual testing? Write the least count of vernier caliper and micrometer screw gauge.	**07**
Q.3	**(a)**	Define leak and leak rate.	**03**
	(b)	Find the leak rate for a football with the given data: Diameter of football is 0.22 m, pressure of the football (Internal pressure) = 1900 mbar. The football is flat after 1 month (internal pressure = external pressure). External pressure is 1000 mbar. Formula ($Q = V\frac{\Delta p}{\Delta t}$) Where Δp is the difference between the internal pressure and the external pressure, Δt is the time, and V is the volume of the container.	**04**
	(c)	With neat sketch explain the helium leak detector.	**07**
		OR	
Q.3	**(a)**	List the technological and physical characteristics of penetrant.	**03**
	(b)	What are the types of penetrant? Explain the sensitivity difference between both the penetrants.	**04**
	(c)	Explain the procedural steps to carry liquid penetrant testing.	**07**
Q.4	**(a)**	What is the principle of liquid penetrant testing?	**03**
	(b)	A component having fatigue crack, the component is made up of aluminium. Which method is suitable out of LPT and MPT?	**04**
	(c)	List the excess penetrant removable methods. Explain any two in details.	**07**
		OR	

Q.4	**(a)**	Draw the hysteresis loop. What is the significance in MPT?	**03**
	(b)	What happen if the component is not to be demagnetized before using in service?	**04**
	(c)	To generate the magnetism in the component, which law has to obey? By using it, explain the circular and longitudinal magnetization.	**07**
Q.5	**(a)**	What is the basic principle of magnetic particle testing?	**03**
	(b)	Explain the yoke and prod method of MPT.	**04**
	(c)	What is fluorescent MPT and how does it differ from visible MPT? List applications where fluorescent MPT is preferred.	**07**

OR

Q.5	**(a)**	List the equipment used in magnetic particle inspection.	**03**
	(b)	Differentiate between diamagnetic, paramagnetic and ferromagnetic materials.	**04**
	(c)	Discuss the common applications and limitations of MPT.	**07**

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