

Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering - SEMESTER - VII EXAMINATION - SUMMER 2025

Subject Code: 3171720

Date: 23-05-2025

Subject Name: Automotive Instrumentation

Time: 02:30 PM TO 05:00 PM

Total Marks: 70

Instructions

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

	Marks
Q.1 (a) List out different automotive subsystems.	03
(b) Name different sensors used in automobile system.	04
(c) Design a highly safe automotive vehicle by choosing and combining different sensors and safety systems in a new way.	07
Q.2 (a) Summarize increasing role of electronics for automotive industry.	03
(b) Classify various automotive safety systems into two categories: active safety systems and passive safety systems.	04
(c) Compare automotive vehicles with and without adaptive power steering.	07
OR	
(c) Contrast the benefits and limitations of adaptive cruise control within an automobile system.	07
Q.3 (a) Develop a scenario showing the application of comfort systems in automobiles.	03
(b) Compare analog and digital instrument clusters in terms of driver information processing, highlighting cognitive load differences.	04
(c) Justify the use of immobilizers in modern vehicles, considering their impact on theft prevention.	07
OR	
(a) Identify components of the fuel control module and illustrate their application in automotive systems.	03
(b) Categorize driving conditions where ABS demonstrates superior performance over conventional braking.	04
(c) Justify why AUTOSAR's layered architecture is more beneficial than traditional ECU software development.	07
Q.4 (a) Analyze why a modern car needs software updates like a smartphone does.	03
(b) Justify the need for strict Electromagnetic Compatibility standards in automotive hardware design, considering modern vehicle electronics.	04

- (c) Identify components and apply their roles to explain an active suspension system using a labeled diagram. 07

OR

- (a) Investigate the impact of electronic transmission control on fuel efficiency compared to traditional hydraulic systems. 03

- (b) Prioritize which vehicle types (passenger cars, trucks, motorcycles) benefit most from ABS implementation. 04

- (c) Construct a functional representation of a generic automotive control ECU with labeled diagrams. 07

- Q.5** (a) Defend the statement that a BMS is more crucial for battery safety than the battery chemistry itself. 03

- (b) Apply the concept of remote keyless entry to illustrate its role in automotive systems. 04

- (c) Analyze the key components of a traction control system and explain how they interact to improve vehicle safety. 07

OR

- (a) Judge the effectiveness of airbags in reducing fatalities when used without seatbelts versus with seatbelts. 03

- (b) Construct a brief sequence illustrating the automotive system assembly process. 04

- (c) Compare the intervention strategies of ESP and traditional stability control systems, identifying key technological differences. 07
