Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VII (NEW) EXAMINATION – WINTER 2024

Subject Code:3171112 Date:11-12-2024

Subject Name: Automotive Electronics

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)**	How do modern automotive systems differ from older mechanical systems in terms of complexity, functionality, and performance.	**03**
	(b)	How does spark timing affect engine performance, and how is it controlled by the engine control system?	**04**
	(c)	What does an optical crankshaft position sensor do, and what sets it apart from other types of position sensors?	**07**
Q.2	**(a)**	Enumerate the essential role of electronics in the automotive industry.	**03**
	(b)	What is a sensor, and could you provide a list of sensors commonly employed in automobiles?	**04**
	(c)	Explain the functioning of electronic fuel control systems and discuss both the advantages and drawbacks associated with this technology.	**07**
		OR	
	(c)	Define idle speed control and its significance. Discuss the role of idle speed control in engine performance.	**07**
Q.3	**(a)**	Explain the concept of engine calibration and its role in maximizing engine performance.	**03**
	(b)	What is the role of airbag sensors in modern vehicles, and how do they work?	**04**
	(c)	Enumerate the seven modes of fuel control and provide a clear illustration of a digital engine control system using diagrams.	**07**
		OR	
Q.3	**(a)**	Describe a pneumatic motor and elaborate on its applications in the automotive industry.	**03**
	(b)	What is a solenoid, and how is it used in automotive systems?	**04**
	(c)	Explain the role of onboard diagnosis (OBD) systems in vehicles and detail their operation.	**07**
Q.4	**(a)**	What is the role of automotive ignition control actuators, and how do they function in the engine control system?	**03**
	(b)	What are some common issues that can arise in a vehicle's electrical system, and how can they be diagnosed and repaired?	**04**
	(c)	Describe the operation of an antilock braking system (ABS) and highlight the benefits it provides compared to conventional braking systems.	**07**
		OR	
Q.4	**(a)**	How has the use of electrical components and systems in vehicles evolved over time, and what are some of the implications for future vehicle design and development?	**03**
	(b)	What are piezoelectric force generators, and what advantages do they offer in actuator technology?	**04**
	(c)	Enumerate the various types of electrical circuits and wiring found in vehicles and explain their design principles for accommodating diverse electrical loads.	**07**

Q.5	**(a)**	Define an electronic suspension system and elaborate on how it enhances vehicle handling and ride comfort.	**03**
	(b)	Paraphrase electric motor actuators used in automobile.	**04**
	(c)	Explain the functioning of digital cruise control and discuss potential hardware implementation challenges in developing such a system for vehicles, along with strategies to mitigate these issues.	**07**

OR

Q.5	**(a)**	List the communication buses used in vehicle network and discuss it.	**03**
	(b)	Detail the operation of an engine coolant temperature (ECT) sensor and its importance in engine control.	**04**
	(c)	What is the function of a throttle actuator in vehicle motion control, and how does it interact with the cruise control system?	**07**

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