


Name: Enrolment No:			
UPES End Semester Examination, May 2024			
Course: Automotive Electrical & Electronic Systems Program: B.Tech ADE Course Code: MECH3045 Instructions: All the questions are compulsory.		Semester: VI Time: 03 hrs. Max. Marks: 100	
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	CO
Q 1	Compare and contrast between hydraulic and electromagnetic actuators used in active suspension systems	4	CO1
Q 2	Explain the function and purpose of an electronic sway bar in a vehicle's suspension system.	4	CO3
Q 3	Explain the principle of operation of an Anti-lock Braking System (ABS) in a vehicle.	4	CO3
Q 4	Explain the principle of operation of a hydraulic power steering system in a vehicle.	4	CO2
Q 5	Describe the working principle of a power window system in a vehicle.	4	CO2
SECTION B (4Qx10M= 40 Marks)			
Q 6	Discuss the concept of an active suspension system in automotive engineering. Describe how it differs from passive and semi-active suspension systems?	10	CO2
Q 7	Describe the key features and functions of a modern vehicle infotainment system. How has technology evolved to integrate entertainment, navigation, communication, and vehicle control into a unified interface?	10	CO1
Q 8	Discuss the components of a typical power steering system. Explain how these components work together to provide easier steering control.	10	CO4
Q 9	Describe the working principle of an electronic sway bar system, including the role of sensors, actuators, and control algorithms. How does the system adjust sway bar stiffness based on driving conditions?	10	CO4
SECTION-C (2Qx20M=40 Marks)			
Q 10	Illustrate the advancements and challenges of Level 3 ADAS, where the vehicle can take full control under certain conditions but still requires driver intervention in emergencies. What are the key differences between Level 3 and lower levels of automation in terms of system complexity and safety considerations?	20	CO5
Q 11	Compare and contrast different types of power window systems, such as cable-driven, rack-and-pinion, and scissor-type mechanisms. Analyze the advantages and limitations of each design in terms of reliability, cost, and ease of maintenance.	20	CO3

OR

Describe the components of an ABS, including sensors, hydraulic modulator, electronic control unit (ECU), and actuators. Explain how these components work together to maintain optimal braking performance.