UPES
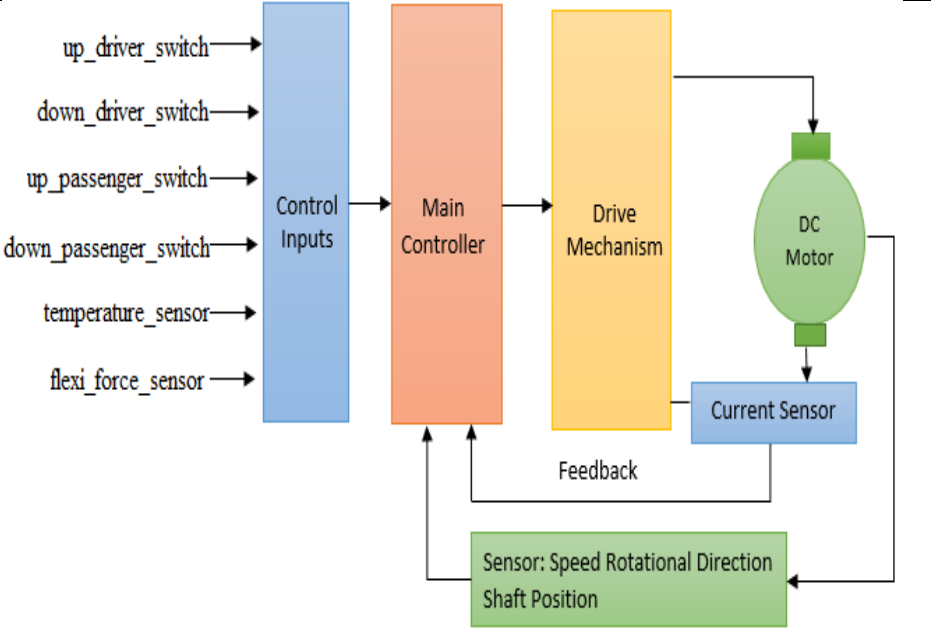**End Semester Examination, May 2025**

Course: Advanced Driver Assistant Systems – ADAS   Semester: VI
Program: B. Tech (ADE)   Time   : 03 hrs.
Course Code: MEAD3036P   Max. Marks: 100

Instructions: This question paper has three sections, Section A, Section B, and Section C.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Explain web-enabled and web-based systems and list different applications of the system.	4	CO1
Q 2	Define automated guided vehicle. Explain different types of automated guided vehicles.	4	CO1
Q 3	Briefly explain advanced driver assistance systems with different applications.	4	CO1
Q 4	Write a short note on the DSRC protocol used in the automotive system.	4	CO2
Q 5	Define LIN and explain important features of LIN protocol.	4	CO1

SECTION B
(4Qx10M= 40 Marks)

Q 6	Explain electronic throttle control. With a block diagram, explain electronic throttle control. Why servomechanism is only used in the closed-loop control system.	10	CO2
Q 7	Assume three nodes (Node 1, Node 2, and Node 3) are attempting to transmit data over a CAN bus. The 11-bit identifiers assigned to each node are as follows: Node 1: 11000001111 Node 2: 11000011000 Node 3: 11000011100	10	CO3

	Tasks:		

	1. Using a graphical representation, explain the CAN bus arbitration process that determines which node wins access to the bus for transmission when multiple nodes attempt to send data simultaneously.
	2. Assume each node has 64-bit data to transmit. Based on this, derive the Remote Frame Format and Data Frame Format, considering the following essential CAN frame components:
	    o SOF (Start of Frame)
	    o Identifier
	    o Control Field
	    o Data Field		

Q 8	Explain Steer-by-Wire. With a neat diagram, differentiate the conventional steering system from the steer-by-wire system. List out various advantages of steer-by-wire.	**10**	**CO 2**
Q 9	What is MISHRA C? Explain the MISRA C guideline used for automotive software development. **OR** With a neat sketch draw the transmission characteristics of the CAN bus and interpret key parameters such as bit rate, transmission speed, maximum cable length, and baud rate.	**10**	**CO 2**
	SECTION-C **(2Qx20M=40 Marks)**		
Q 10	Design and develop an electrical circuit and control system for a power window system used in a vehicle considering the below diagram as different inputs for system development. Also, explain the need for various blocks used in the below block diagram.	**20**	**CO3**

Q 11	Design an intelligent drive-by-wire system with an appropriate different sensor and actuator. With a block diagram explain the drive-by-wire system. List out the advantages and limitations of drive-by-wire technology. **OR** With neat block diagram explains different components used in the electric and hybrid vehicle drive train under series and parallel hybrid configurations. Explain the advantages and limitations of both configurations.	**20**	**CO3**