Name: Enrolment No:	

UPES

End Semester Examination, December 2023

Course: Vehicle Infotronics — **Semester:** VII

Program: B. Tech. (ADE) — **Time:** 03 hrs.

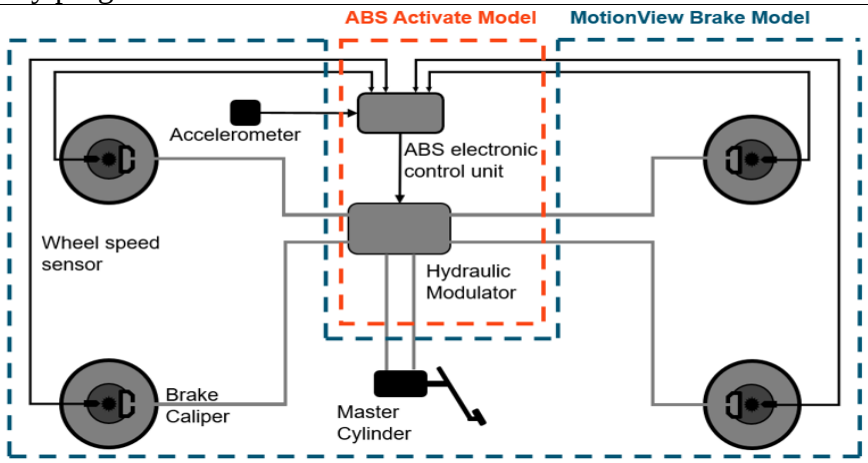
Course Code: MEAD 4013 — **Max. Marks:** 100

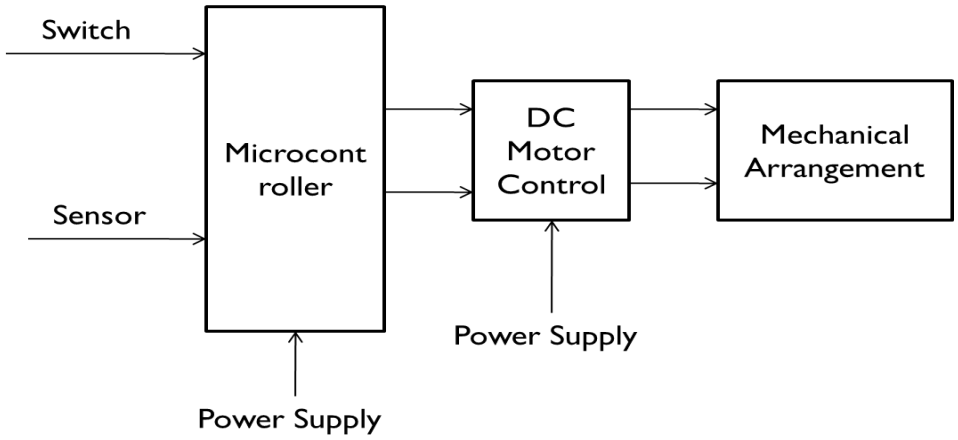
Instructions: This question paper has three sections, Section A, Section B, and Section C.

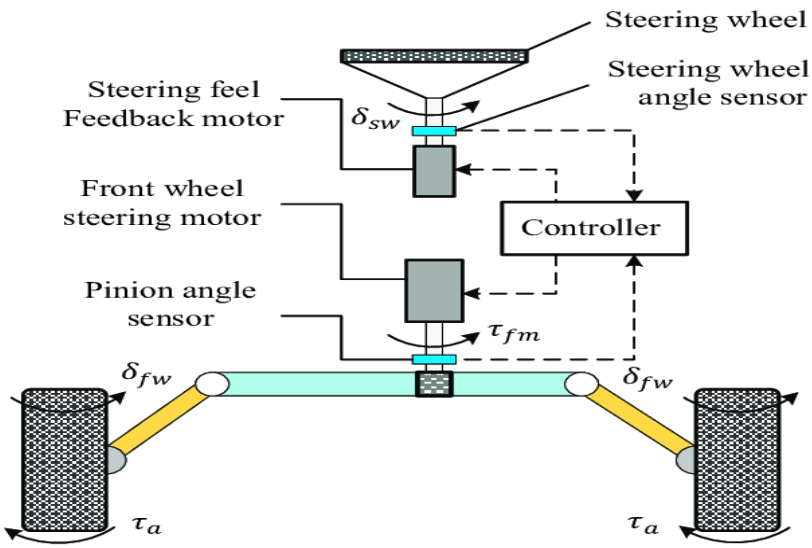
SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	With a neat diagram explain understeer and oversteer.	4	CO1
Q 2	List out major factors that influence the use of electrical and electronics-based system development for the automotive industry.	4	CO2
Q 3	With a neat diagram analyze the classical V model development cycle.	4	CO3
Q 4	Explain in detail the concept of vehicle infotronics. List out the major applications of infotronics.	4	CO3
Q 5	Explain the MISRA C guideline used for automotive software development.	4	CO1

SECTION B
(4Qx10M= 40 Marks) (Answer any four questions)

Q 6	Illustrate AUTOSAR? Explain the different layers used in AUTOSAR.	10	CO3
Q 7	Explain the working of the electronic stability program with a block diagram. Also, explain the advantages, and disadvantages of the ESP. Differentiate the antilock braking system and traction control system with an electronic stability program.	10	CO4
Q 8	 Design a hydraulic circuit for the anti-lock braking system, where the system pressure is 15 bar. Assume an appropriate solenoid-operated directional	10	CO4

	control valve and actuator. With the relay logic circuit, control the hydraulic circuit of the antilock braking system.		
Q 9	Assume three nodes want to transmit data through the CAN bus and the 11bit identifier for node A is 11000001111, node B is 11000011100, and node C 11000011000. With respect to graphical representation elucidate the CAN bus arbitration process. Consider node A, node B, and node C having 32-bit data for transmission to derive remote frame format and data frame format considering SOF, identifier, control bit, data bit, and CRC bit of remote frame format and data frame format.	**10**	**CO4**
Q10	Write a short note with a neat diagram explaining the series hybrid drive train structure used in electric hybrid vehicles.	**10**	**CO3**
SECTION-C (2Qx20M=40 Marks)			
Q 11	Design and development of power window for a low-cost anti-pinch control system for electrical window with neat sketch. During design consider the system has six components which are window, frame, guide rail, electric motor, door frame, and control system. 	**20**	**CO5**
Q 12	Consider the block diagram as an electronic steering system and accordingly perform the following task: 1) Design a hydraulic circuit for steering arrangement considering a hydraulic motor as an actuator and use 4/3 DCV on both side solenoids operated. 2) Design a relay-based circuit to control an electrohydraulic circuit. Assuming three inputs (STOP, Forward, and Reverse) and two outputs (Solenoid1 and Solenoid2) are required to build relay logic. 3) Design ECU and driver IC-based circuit/Block diagram to control the electrohydraulic circuit for the development of the steer-by-wire system. (Select useful sensor input)	**20**	**CO5**



OR

Why has In-vehicle networking become popular with respect to the wire harness system? List out the major advantages and limitations of the conventional wire harness system. Below neat diagram of how the proposed system manages today's advanced vehicle network design challenges.