UPES
UNIVERSITY OF TOMORROW

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2023

Course: Vehicle Infotronics	**Semester:** VIII
Program: B. Tech (ADE)	**Time** : 03 hrs.
Course Code: MEAD 3004P	**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 the adaptive cruise control system (ACC).	4	CO1
Q 2	Define automated guided vehicle. Explain different types of automated guided vehicles.	4	CO3
Q 3	'Future of automotive creations lies in Infotronics', justifies this statement.	4	CO2
Q 4	Write a short note on the DSRC protocol used in the automotive system.	4	CO3
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	CO4
Q 7	Assume three nodes want to transmit data through the CAN bus and the 11-bit identifier for node 1 is 11001011111, node 2 is 11001111111, and node 3 is 11001011001. With respect to graphical representation elucidate the CAN bus arbitration process. Consider node 1, node 2 and node 3 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	CO3
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 4

Q 9	What is MISHRA C? Explain the MISRA C guideline used for automotive software development.	10	CO 4
	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	CO5
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 advantage and limitations of drive-by-wire technology. **OR** With neat block diagram explain different components used in the electric and hybrid vehicle drive train under series and parallel hybrid configuration. Explain the advantages and limitations of both configurations.	20	CO5