Enrolment No:	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, April/May 2018

Program Name: B. Tech (ADE)	**Semester :** VIII
Course Name : Vehicle Infotronics	**Max. Marks : 100**
Course Code : ADEG 441	**Duration : 3 Hrs**
No. of page/s: 2	

SECTION A
All questions are compulsory and carry equal marks.

S. No.		Marks	CO
Q 1	Explain IEEE 802.11p with respect to automotive industry.	5	CO1
Q 2	Define ADAS with respect to modern vehicular technology.	5	CO2
Q 3	Describe briefly why legislation has a considerable effect on the development of automotive industry.	5	CO2
Q 4	What is ISO/OSI reference model? Which layer is part of the CAN bus system development process.	5	CO3

SECTION B
Answer any four questions.

Q 5	Explain four frame format i.e. data frame, remote frame, error frame and overload frame used in CAN bus communication protocol.	10	CO4
Q 6	What is Steer-by-Wire? With near diagram differentiate conventional steering System with Steer-by-Wire System. List out various advantages of Steer-by-Wire.	10	CO1
Q 7	With neat block diagram design electronic stability program (ESP) system. How understeer and oversteer got eliminated in ESP equipped vehicle.	10	CO5
Q 8	Analyse below circuit and explain various components of circuit which is specified by different numbers.	10	CO4
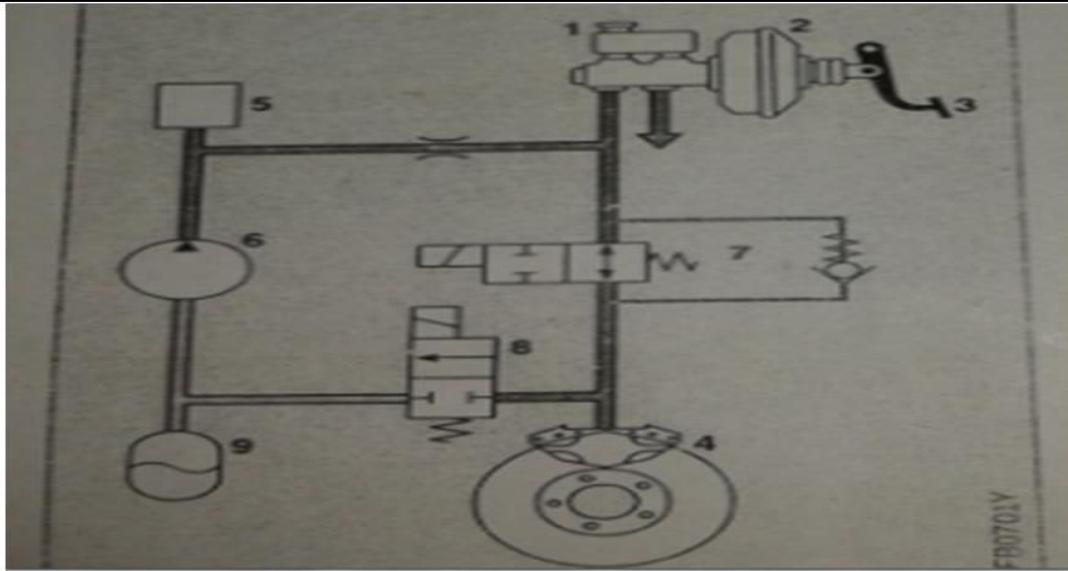
Q 9	With neat diagram explain different types by drive train techniques used in different class of vehicle:
	    1) Parallel hybrid
	    2) Series hybrid
	    3) Series-parallel hybrid
		10	CO3

SECTION-C **Answer any two questions.**			
Q 10.A	Design intelligent drive by wire system with appropriate different sensor and actuator. With block diagram explain the drive by wire system. List out advantage and limitations of drive by wire technology.	10	CO5
Q 10.B	Illustrate concept of automated guided vehicles. On the basis of technology used for the development AGV explain different types of guiding techniques used in AGV.	10	CO5
Q 11.A	List out different application of vehicle Infotronics system. Also explain each of them briefly.	10	CO4
Q 11.B	With neat diagram analyse classical V model development cycle. Also describe various tool and technology used in V cycle development process.	10	CO3
Q 12	Assume three node want to transmit data through CAN bus and 11bit identifier for node 1 is 11001011111, node 2 is 11001111111 and node 3 11001011001. With respect to graphical representation elucidate CAN bus arbitration process. Consider node 1, node 2and node 3 having 32 bit data for transmission 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.	20	CO2

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SECTION A
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S. No.		Marks	CO
Q 1	What is NVH in Automobile? Explain its components.	5	CO1
Q 2	Illustrate with neat diagram the operation of an engine speed measurement system using magnetic transducer.	5	CO2
Q 3	Describe briefly why legislation has a considerable effect on the development of automotive industry.	5	CO2
Q 4	Define ADAS with respect to modern vehicular technology.	5	CO3

SECTION B
Answer any four questions.

Q 5	Explain CAN Bus system. Explain CAN bus message format with neat sketch and explain each frame.	10	CO4
Q 6	Explain EMI issues and possible remedies in term of automotive system.	10	CO1
Q 7	With neat block diagram design electronic stability program (ESP) system. How understeer and oversteer got eliminated in ESP equipped vehicle.	10	CO5
Q 8	Analyse below system and explain various components which replace conventional mechanical system to electronics based steer-by-Wire System.	10	CO4

Steering System
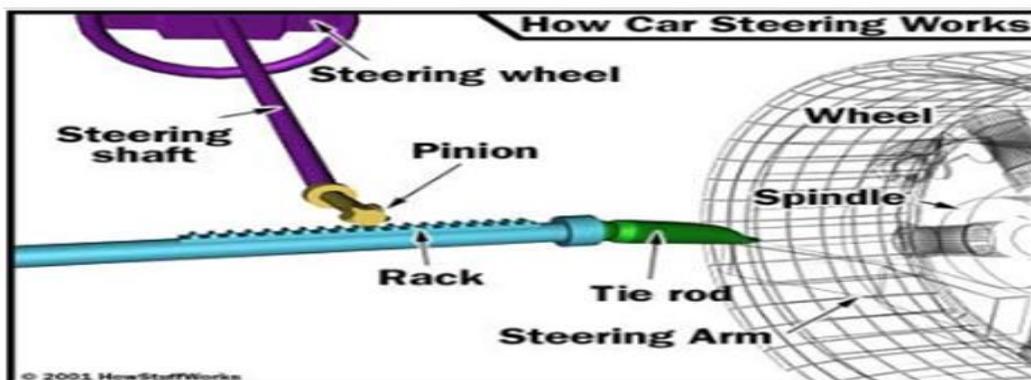
Q 9	Explain wire harness system in the vehicle. Why in vehicle networking became popular with respect to wire harness system. List out major advantages with conventional harness system.	**10**	**CO3**

<div align="center">

SECTION-C
Answer any two questions.

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Q 10.A	Design intelligent drive by wire system with appropriate different sensor and actuator. With block diagram explain the drive by wire system. List out advantage and limitations of drive by wire technology.	**10**	**CO5**
Q 10.B	Illustrate concept of automated guided vehicles. On the basis of technology used for the development AGV explain different types of guiding techniques used in AGV.	**10**	**CO5**
Q 11.A	Consider below subsystem of modern vehicle architecture. For the design and development of various automotive system which is represented in below figure list out various in vehicle in vehicle networking protocol. Which type of protocol is suitable for which subsystem of the vehicle? Justify your answer with technical specification of that specific protocol. 	**10**	**CO4**
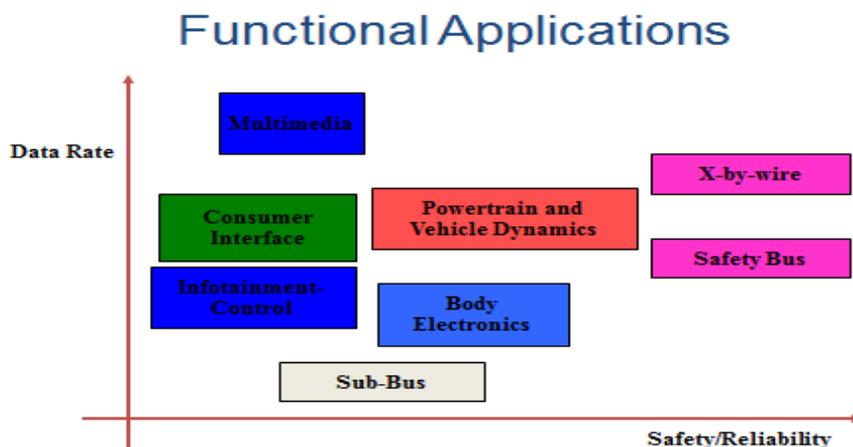
Q 11.B	Explain Embedded Systems Software Development Process used for system development in automotive industry. Also describe various tool and technology used in V cycle development process.	10	CO3
Q 12	 **Figure: Tire Force Variation** With respect to the four frequency regions of Figure **Tire Force Variation**, the following generally desired suspension damping characteristics can be identified. Explain electronic suspension system with respect to following characteristics curve and region of operation.	20	CO2
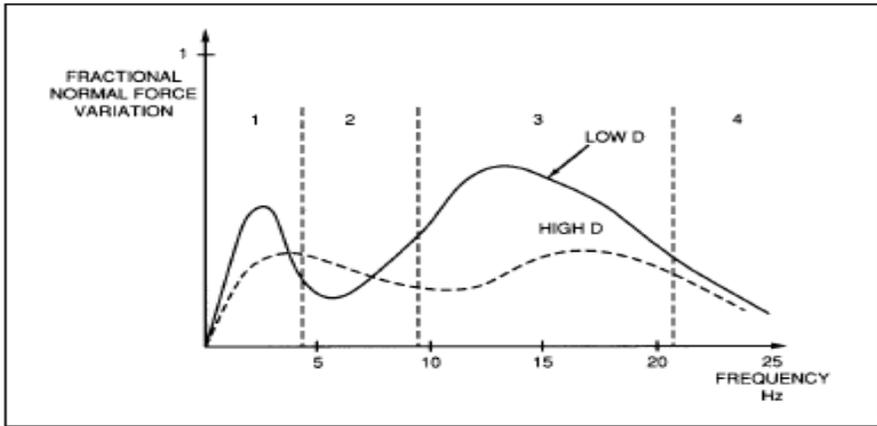
Region	Frequency (Hz)	Damping
1. Sprung Mass mode	1-2	High
2. Intermediate Ride	2-8	Low
3. Unsprung mass response	8-20	High
4. Harshness	>20	Low