

Enrolment No:



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

Program Name: B. Tech (ADE)

Semester : VI

Course Name : Vehicle Infotronics

Max. Marks : 100

Course Code : ADEG 443

Duration : 3 Hrs

No. of page/s: 2

SECTION A

All questions are compulsory and carry equal marks.

S. No.		Marks	CO
Q 1	Define ADAS with respect to modern vehicular technology.	5	CO1
Q 2	Explain various market driver factors for automotive industry.	5	CO2
Q 3	Classify various electronics controls unit used in vehicle.	5	CO2
Q 4	What is NVH in Automobile? Explain its components.	5	CO3

SECTION B

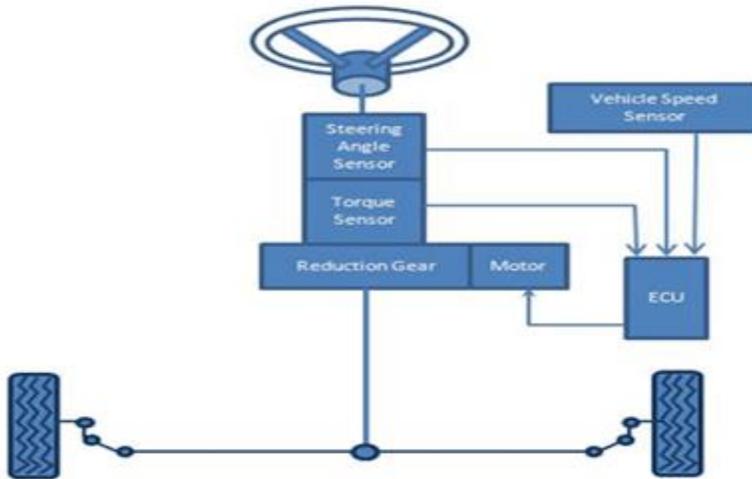
Answer any four questions.

Q 5	With neat diagram analyse classical V model development cycle. Also describe various tool and technology used in V cycle development process.	10	CO3
Q 6	Using appropriate example explain five different types of error handling mechanism used in CAN bus system.	10	CO4
Q 7	Explain frame format error frame and overload frame used in CAN bus communication protocol. How transmit error count and receive error count is changing in fault confinement process.	10	CO5
Q 8	Design electronic stability program (ESP) system. The following parameters must be included in designing: Block diagram, replacement of mechanical component with sensors and actuators and circuit diagram. How understeer and oversteer got eliminated in ESP equipped vehicle.	10	CO4
Q 9	With neat block diagram explain different types by drive train techniques used in different class of vehicle: 1) Series hybrid 2) Parallel hybrid	10	CO3

SECTION-C
Answer all the questions.

Q 10.

Steer by wire



20
(8+6+6)

CO4

Consider above diagram as steering system.

- 1) Design a hydraulic circuit for steering arrangement considering hydraulic motor as an actuator and use 4/3 DCV both side solenoid operated.
- 2) Design a relay based circuit to control electrohydraulic circuit. Assuming three input (STOP, Forward and Reverse) and two outputs (Solenoid1 and Solenoid2) is required to build relay logic.
- 3) Design ECU and driver IC based circuit/Block diagram to control electrohydraulic circuit for the development of steer by wire system.

Q 11

Considering three node want to transmit data through CAN bus and 11bit identifier for

Node 1 is 11001011111
 Node 2 is 11001111111
 Node 3 is 11001011001.

- 1) With respect to graphical representation elucidate CAN bus arbitration process and prove it follows CSMA/CD-CR protocol.
- 2) Consider node 1 is RPM sensor, node 2 is coolant temperature sensor and node 3 is accelerator pedal position sensor having 64 bit data for transmission, derive and explain Remote frame format and Data frame format considering all necessary bits.

20
(10+10)

CO5

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SECTION A

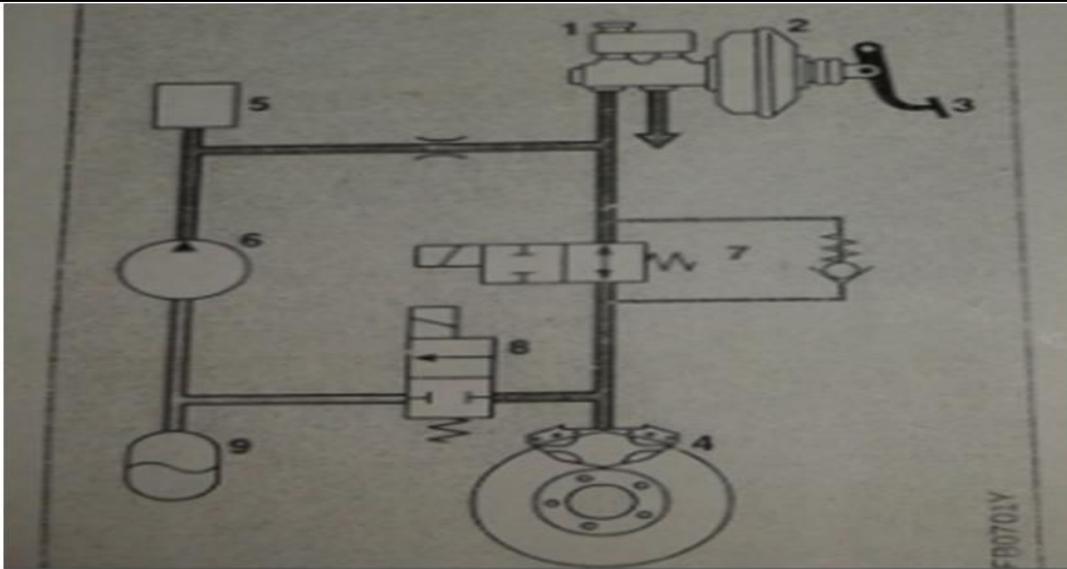
All questions are compulsory and carry equal marks.

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	CO3
Q 6	What is Steer-by-Wire? With neat 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	CO3
Q 8	Analyse below circuit and explain various components of circuit which is specified by different numbers.	10	CO4



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

SECTION-C

Answer any two questions.

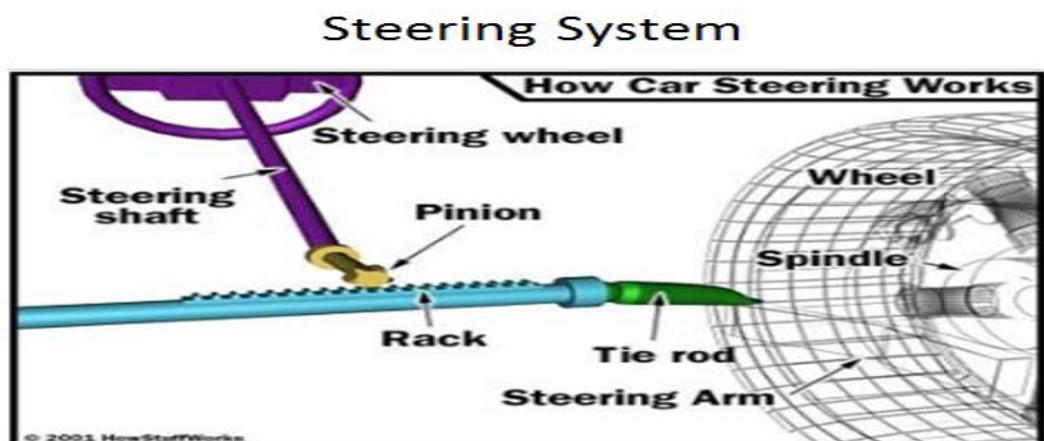
Q 10.A Design intelligent drive by wire system with appropriate different sensor and actuator. With block diagram explain the drive by wire system. List out advantage and limitations of drive by wire technology.

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 Analyse below system and explain various components which replace conventional mechanical system to electronics based steer-by-Wire System.



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	CO4
Q 12	Assume three node want to transmit data through CAN bus and 11 bit or 29 bit identifier for node 1 is 11001011111, node 2 is 11001111000 and node 3 11001011000. With respect to graphical representation elucidate CAN bus arbitration process. Consider node 1, node 2 and 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	CO5