(3 Hours)   **Total Marks-80**

N.B.: 1. Question No: 1 is compulsory.
    2. Solve any three questions out of remaining questions.
    3. Assume Suitable data where necessary.

Q 1]	a)	What is embedded system? Discuss the classification of embedded system with one example each.	10M
	b)	What do you mean by X by Wire Technology? Explain Drive by wire, Brake by wire and Throttle by wire with suitable example each.	10M

Q 2]	a)	Explain working of Manifold Absolute Pressure (MAP) Sensor.	05M
	b)	Write a note on Code Warrior IDE.	05M
	c)	Define system bus and explain its types.	05M
	d)	Explain different control modules in ECM.	05M

Q 3]	a)	Explain CAN and FLEXRAY protocol for Automotive Embedded system.	10M
	b)	Explain modes of operations of MC9S12XD family.	10M

Q 4]	a)	Draw and explain block diagram of MC9S12XD family.	10M
	b)	What is ECU? Explain ECU algorithm, Engine maps and Lookup tables.	10M

Q 5]	a)	Explain any two actuators used in automobiles with neat labelled diagram.	10M
	b)	Explain the modes of operation of SPI.	10M

Q 6]	a)	Write short notes on I2C module.	05M
	b)	Explain Antilock braking system.	05M
	c)	Explain different classes of Multiplexing Communication Protocol?	05M
	d)	Explain SCI module.	05M