Register Number:……..

KUMARAGURU college of technology
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B.E DEGREE EXAMINATIONS: APRIL/MAY 2024

(Regulation 2018)

Sixth Semester

AUTOMOBILE ENGINEERING

U18AUI6201: Automotive Embedded Systems

COURSE OUTCOMES

CO1: Select suitable sensors for measuring parameters in automotive systems.

CO2: Choose the appropriate actuator and driver for automotive applications.

CO3: Outline the concepts of embedded systems.

CO4: Design of hardware model for automotive system using microcontroller.

CO5: Build codes for automotive embedded applications.

CO6: Compare the wired and wireless communication protocols.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions: -

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

1.	Identify the use of analog sensor in automotive.	CO1	[K_2]
2.	Distinguish between analog sensor and digital sensor.	CO1	[K_2]
3.	Define the purpose of H Bridge driver.	CO2	[K_3]
4.	Explain the function of Optoisolator.	CO2	[K_2]
5.	Draw the TMOD and TCON register.	CO3	[K_2]
6.	List the pin configuration of 8051.	CO3	[K_2]
7.	Build a simple relay circuit using 8051 controllers.	CO4	[K_6]
8.	List the pins of LCD 16x2 display.	CO4	[K_2]
9.	Apply the concept of IoT platform in electric vehicle.	CO6	[K_3]
10.	List the Wired Communication Protocols in automotive.	CO6	[K_2]

Answer any FIVE Questions:-

PART B (5 x 16 = 80 Marks)

(Answer not more than 400 words)

11.	a)	Analyze the working principle, mounting location and features of lambda sensor.	12	CO1	[K_4]
	b)	List the application of Hall effect sensor in automotive.	4	CO1	[K_2]

12.	a)	Design the circuit for Solenoid actuator to interface with 8-bit microcontrollers.	12	CO2	[K_6]
	b)	Explain the working principle of Piezoelectric Actuators.	4	CO2	[K_2]
13.	a)	Explain the 8051 Hardware architecture and write the features of 8051 microcontroller.	12	CO3	[K_2]
	b)	Design an 8051 system to generate a square wave of 5 kHz frequency via pin P2.0 using Timer 0 in mode 1.	4	CO3	[K_6]
14.	a)	Design the handbrake system indicator for a four wheeled vehicle using an 8051 controller. Consider that the limit switch interface via the p3.4 pin and LED is driven from the p2.4 pin of the 8051 system.	12	CO5	[K_6]
	b)	Explain the decision-making statement in embedded c with example?	4	CO4	[K_2]
15.	a)	Describe in detail the operation of CAN protocol and explain the CAN ECU Network in automotive system.	12	CO6	[K_2]
	b)	Distinguish between wired & wireless communication	4	CO6	[K_2]
16.	a)	Explain the process of interfacing a position sensor, such as a potentiometer, with an ADC in an 8051-microcontroller system. Provide a detailed description of the hardware connections and the necessary programming steps.	12	CO5	[K_2]
	b)	Explain about SPI wired communication protocol with neat sketch.	4	CO6	[K_2]

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