**KUMARAGURU**
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**B.E DEGREE EXAMINATIONS: APRIL / MAY 2023**

(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. | Differences between a MAP and MAF sensor. | CO1 | [$K_1$] |
| 2. | Which sensor is used to measure the vibration of the engine? | CO1 | [$K_2$] |
| 3. | What is meant by Solenoid Switching? | CO2 | [$K_1$] |
| 4. | List the application of Relay. | CO2 | [$K_3$] |
| 5. | Compare Microprocessor and Microcontroller with an example. | CO3 | [$K_2$] |
| 6. | What are interrupts and its types? | CO3 | [$K_1$] |
| 7. | Explain the concept of serial communication interface with microcontrollers. | CO4 | [$K_2$] |
| 8. | Draw the waveform of Pulse width Modulation (PWM). | CO4 | [$K_1$] |
| 9. | List the application of Wireless protocol. | CO6 | [$K_1$] |
| 10. | How does the Internet of Everything relate to the Internet of Things? | CO5 | [$K_1$] |

**Answer any FIVE Questions: -**
**PART B (5 x 16 = 80 Marks)**
**(Answer not more than 400 words)**

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|---|---|---|---|---|---|
| 11. | a) | Illustrate the working principle of Proximity sensors with neat sketch. | 12 | CO1 | [K$_2$] |
| | b) | Explain the concept of Hall effect sensor. | 04 | CO1 | [K$_1$] |
| | | | | | |
| 12. | a) | Construct the Relay driver circuit to interface with 8051 microcontrollers. | 12 | CO2 | [K$_3$] |
| | b) | Compare stepper motor with servo motor based on working and its application. | 04 | CO2 | [K$_4$] |
| | | | | | |
| 13. | a) | Explain the basic architecture of 8051 microcontroller. | 12 | CO3 | [K$_2$] |
| | b) | Interpret the if-else decision-making statement in embedded c with example. | 04 | CO3 | [K$_2$] |
| | | | | | |
| 14. | a) | Build the hardware and software for LCD interface with 8051 microcontrollers. | 12 | CO4 | [K$_3$] |
| | b) | Relate the oscillator and Reset circuit in 8051 controllers. | 04 | CO4 | [K$_2$] |
| | | | | | |
| 15. | a) | Construct the embedded C program to run the DC motor in both forward and reverse direction with delay using 8051 microcontrollers. | 12 | CO5 | [K$_3$] |
| | b) | Explain the frame format and working of I2C Protocol with features. | 04 | CO5 | [K$_2$] |
| | | | | | |
| 16. | a) | Analyze the interface of HC-05 Bluetooth and microcontroller with neat diagram. Also Outline the embedded C program to transmit and receive the serial data via UART. | 12 | CO6 | [K$_4$] |
| | b) | Design the vehicle network system for an E-vehicle using CAN bus. | 04 | CO6 | [K$_4$] |

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