# KUMARAGURU
## college of technology
### character is life

**B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2023**

(Regulation 2018)

Seventh Semester

**ELECTRICAL AND ELECTRONICS ENGINEERING**

U18EEE0009: Automotive Electronics

## COURSE OUTCOMES

**CO1:** Gain the knowledge on electrical and electronics systems available in modern automobiles.

**CO2:** Understand the role of Electronics Control Unit in modern automobiles.

**CO3:** Outline the various stages of Integrated development environment to design an embedded system.

**CO4:** Understand the internals of various embedded system design to ensure occupant's safety and comfort.

**CO5:** Comprehend the fundamentals of vehicle 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. Summarize the importance of spark plugs in an automobile. | CO1 | [K2] |
| 2. Outline the factors to be considered in selecting battery for an automobile. | CO1 | [K2] |
| 3. Infer how emissions are controlled in automobiles. | CO2 | [K2] |
| 4. Illustrate the generic electronic engine control system. | CO2 | [K2] |
| 5. Outline the steps involved in software development cycle. | CO3 | [K2] |
| 6. Define cross-compiler. | CO3 | [K1] |
| 7. State the purpose of navigation system in an automobile. | CO4 | [K1] |
| 8. State the importance of On-Board Diagnostics in modern automobiles. | CO4 | [K1] |
| 9. Illustrate the block diagram of $I^2C$ protocol. | CO5 | [K2] |
| 10. List the features of FLEXRAY protocol. | CO5 | [K1] |

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

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|---|---|---|---|---|---|
| 11. | a) | Explain the ignition system of an automobile with a neat diagram. | 10 | CO1 | [K2] |
| | b) | Summarize the importance of alternators and voltage regulators in charging system. | 6 | CO1 | [K2] |

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|---|---|---|---|---|
| 12. | a) | Explain the powertrain subsystem of an automobile. | 8 | CO2 [K$_2$] |
| | b) | Explain the importance of MAF sensor and Moving vane meter. | 8 | CO2 [K$_2$] |
| 13. | a) | Write a short note on the various stages of Integrated Development Environment to design an embedded system. | 6 | CO3 [K$_2$] |
| | b) | Illustrate the simple and sophisticated target system with neat diagrams. | 10 | CO3 [K$_2$] |
| 14. | | Classify and explain any four sensors available in engine management system. | 16 | CO4 [K$_2$] |
| 15. | | Explain the architecture and frame format of CAN protocol in detail. | 16 | CO5 [K$_2$] |
| 16. | a) | Explain the operation of ABS with a neat diagram. | 8 | CO4 [K$_2$] |
| | b) | Describe engine management system with its block diagram. | 8 | CO4 [K$_2$] |

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