| Reg. No. | | | | | | | | | | | | |
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| Question Paper Code | 12555 |
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**B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024**

Eighth Semester

**Electrical and Electronics Engineering**

**20EEEL806 - CONTROL OF ELECTRIC VEHICLE**

Regulation - 2020

Duration: 3 Hours | Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

| | | Marks | K – Level | CO |
|---|---|---|---|---|
| 1. | You are driving a car and are approaching a hill. Assume there are three variables in this system: gas pedal, the hill and the car's speed. Classify each of these variables as process/controlled variable, manipulated variable, or disturbance variable. | 2 | K2 | CO1 |
| 2. | Outline the sketch of the V diagram. | 2 | K2 | CO1 |
| 3. | Define Percentage Road Departure. | 2 | K1 | CO2 |
| 4. | What is meant by cruise control? | 2 | K1 | CO2 |
| 5. | What is Knocking? | 2 | K1 | CO3 |
| 6. | List any Four Engine control loop. | 2 | K1 | CO3 |
| 7. | What are the types of Hybrid Electric Vehicles? | 2 | K1 | CO4 |
| 8. | List the four submodels present in the fuel-cell stack model. | 2 | K1 | CO4 |
| 9. | Outline the goal of AVCS –I. | 2 | K2 | CO5 |
| 10. | What is risk homeostasis? | 2 | K1 | CO5 |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

| | | | Marks | K – Level | CO |
|---|---|---|---|---|---|
| 11. | a) | Explain the important subsystems in a vehicle. | 13 | K2 | CO1 |
| | | **OR** | | | |
| | b) | Summarize the various sensors and the measurement variable used in the automobile control system. | 13 | K2 | CO1 |
| 12. | a) | Explain in detail about the Adaptive Cruise Control System. | 13 | K2 | CO2 |
| | | **OR** | | | |
| | b) | Explain the feed-forward control with block diagram and example for automobile system. | 13 | K2 | CO2 |
| 13. | a) | Illustrate the concept of driving simulators to reduce SVRD accidents. | 13 | K2 | CO3 |
| | | **OR** | | | |
| | b) | Explain the Idle speed control, spark timing control and knock control in detail. | 13 | K2 | CO3 |

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|---|---|---|---|---|---|
| 14. | a) | With a neat diagram explain the split hybrid configuration of hybrid electric vehicle. | *13* | *K2* | *CO4* |
| | | **OR** | | | |
| | b) | With a neat diagram explain the series hybrid configuration of hybrid electric vehicle. | *13* | *K2* | *CO4* |
| 15. | a) | Explain the advanced traveler information system in detail. | *13* | *K2* | *CO5* |
| | | **OR** | | | |
| | b) | Discuss the ways in which such site-specific information can be provided to a vehicle and used by vehicle control systems. | *13* | *K2* | *CO5* |

**PART - C (1 × 15 = 15 Marks)**

| | | | | | |
|---|---|---|---|---|---|
| 16. | a) i) | Discuss the concept of degrees of freedom in detail with examples. | *8* | *K2* | *CO1* |
| | ii) | Explain the Advanced Vehicle Control System I (AVCS –I) in detail. | *7* | *K2* | *CO5* |
| | | **OR** | | | |
| | b) i) | Compare the two common approaches used in Industry for system engineering. | *8* | *K2* | *CO1* |
| | ii) | Explain the cross over model principle in detail. | *7* | *K2* | *CO5* |