



B.E DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Sixth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U18EEE0013: Electric Vehicle Technology

COURSE OUTCOMES

- CO1:** Gain the knowledge on the fundamentals and benefits of Electric vehicles.
- CO2:** Understand the performance of various subsystems in Electric vehicles.
- CO3:** Analyze the choice of Electric motor drive technologies used in Electric vehicles.
- CO4:** Compare and Select the appropriate energy source for Electric vehicles.
- CO5:** Acquire the concepts of grid connected technologies.

Time: Three Hours

Maximum Marks: 100

**Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)**

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|--|-----------------------|
| 1. What is meant by an electric vehicle? | CO1 [K ₁] |
| 2. List the components of electric vehicles. | CO1 [K ₁] |
| 3. Define Aerodynamic drag | CO2 [K ₁] |
| 4. Interpret Grading resistance. | CO2 [K ₂] |
| 5. What is motor drive in electric vehicles? | CO3 [K ₁] |
| 6. List the types of Power converters. | CO3 [K ₁] |
| 7. Outline the Battery Management System. | CO4 [K ₂] |
| 8. Classify the various types of Battery. | CO4 [K ₂] |
| 9. Recall the Electric vehicle charging standards. | CO5 [K ₁] |
| 10. What is an EV charging station? | 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. | Compare electric vehicles to internal combustion engine vehicles and solar-powered electric vehicles in terms of operating costs and emissions. | 16 | CO1 | [K ₂] |
| 12. | Explain rolling resistance and aerodynamic drag in vehicles. | 16 | CO2 | [K ₂] |
| 13. | a) Summarize in detail about the control of permanent magnet motor drives. | 8 | CO3 | [K ₂] |
| | b) Develop the Overview of Power Converters and its control Strategies. | 8 | CO3 | [K ₃] |
| 14. | a) Classify the various types of EV batteries. | 6 | CO4 | [K ₂] |
| | b) Experiment with a Battery Management System (BMS) working in electric vehicle batteries. | 10 | CO4 | [K ₃] |
| 15. | a) How do V2G, G2V, V2B, and V2H modes of operation for EV charging stations work? | 8 | CO5 | [K ₂] |
| | b) Name the different types of EV charging stations and explain any two in detail. | 8 | CO5 | [K ₂] |
| 16. | a) How does regenerative braking work in electric vehicles? | 10 | CO4 | [K ₂] |
| | b) Analyse the Electric motor drive technologies for Electric Vehicles. | 6 | CO3 | [K ₄] |
