CBCS SCHEME

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BME306A

# Third Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
## Electric and Hybrid Vehicle Technology

Time: 3 hrs. Max. Marks: 100

***Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.***
***2. M : Marks , L: Bloom's level , C: Course outcomes.***

| | | Module – 1 | M | L | C |
|---|---|---|---|---|---|
| Q.1 | a. | Discuss the need of Electric and hybrid vehicles. List their advantages and limitations. | 10 | L1 | CO1 |
| | b. | Explain the basic architecture and types of EV and HV. | 10 | L2 | CO1 |
| | | **OR** | | | |
| Q.2 | a. | Discuss the methods and technology used in disposal of batteries, cell, hazardous materials. | 10 | L1 | CO1 |
| | b. | Explain the impact on environment of conventional, EV, HEV. | 10 | L2 | CO1 |
| | | **Module – 2** | | | |
| Q.3 | a. | Discuss the various power, energy management strategies and its general architecture in EV and HV. | 10 | L1 | CO2 |
| | b. | With a neat sketch, explain Fuel cells and their characteristics. | 10 | L2 | CO2 |
| | | **OR** | | | |
| Q.4 | a. | Discuss briefly importance, advantages and application of super capacitors. | 10 | L1 | CO2 |
| | b. | Discuss the various energy storage devices and also explain the selection criteria of them. | 10 | L1 | CO2 |
| | | **Module – 3** | | | |
| Q.5 | a. | Explain various types of motors and size and selection criteria of them. | 10 | L2 | CO3 |
| | b. | Explain traction motors variable speed electric motor characteristics with a neat sketch. | 10 | L2 | CO3 |
| | | **OR** | | | |
| Q.6 | a. | Explain IPM motors and their characteristics. | 10 | L2 | CO3 |
| | b. | Discuss the types of mechanical and electrical connections of motors. | 10 | L2 | CO3 |
| | | **Module – 4** | | | |
| Q.7 | a. | Sketch and explain rolling resistance and aero dynamic drag in electric vehicles. | 10 | L2 | CO4 |
| | b. | Discuss the design parameters of batteries ultra capacitors and Fuel cells. | 10 | L1 | CO4 |
| | | **OR** | | | |
| Q.8 | a. | Explain the total tractive effort, torque required, transmission efficiency of the drive wheel. | 10 | L2 | CO4 |
| | b. | With a neat sketch, explain Lead-Ion batteries. | 05 | L2 | CO4 |
| | c. | Explain major types of rechargeable in EV and HVE. | 05 | L2 | CO4 |
| | | **Module – 5** | | | |
| Q.9 | a. | Define the term battery charging and termination. Name different methods of battery charging. | 10 | L1 | CO5 |
| | b. | Explain importance of power electronics converters for battery charging. | 10 | L2 | CO5 |
| | | **OR** | | | |
| Q.10 | a. | Discuss the battery charging stations and its installation and commissioning. | 10 | L1 | CO5 |
| | b. | Discuss the domain related grid inter-connections of electric and hybrid vehicles. | 10 | L1 | CO5 |

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