CBCS SCHEME

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21EE734

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
Electric Vehicle Technologies

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain with neat sketch conceptual illustration of ev configuration. **(08 Marks)**

b. With a neat schematic diagram, explain the configuration of parallel hybrid electric drive. **(08 Marks)**

c. Explain rolling resistance and aerodynamic drag in electric vehicles. **(04 Marks)**

OR

2 a. Discuss briefly tractive effort in different representation in drive cycle. **(07 Marks)**

b. State various architectures of hybrid electric drive train explain any one in detail. **(07 Marks)**

c. Explain fraction motors variable Speed Electric motor characteristics with neat sketch. **(06 Marks)**

Module-2

3 a. What are various Battery parameters ? Explain them in detail. **(10 Marks)**

b. Explain basic working principles of fuel cell with neat diagram. **(10 Marks)**

OR

4 a. List major types of rechargeable batteries in EV and HEV and explain any two with proper reactions. **(10 Marks)**

b. Explain super capacitor as storage for EV and HEV applications. **(10Marks)**

Module-3

5 a. Explain in detail functional block diagram of a typical Electric propulsion system. **(10 Marks)**

b. Discuss in detail forward motoring and regenerative braking control using class c – chopper. **(10 Marks)**

OR

6 a. With a near diagram, explain the speed control of the BLDC motor. **(10 Marks)**

b. Draw and explain basic EV induction motor drive configuration. **(10 Marks)**

Module-4

7 a. Explain how power rating design of the fraction motor is done in series Hybrid train. **(10 Marks)**

b. Explain in detail control strategies of parallel Hybrid drive train. **(10 Marks)**

OR

8 a. What are the various operating modes of the parallel drive train. **(10 Marks)**

b. With a neat block diagram, explain a typical series hybrid electric drive train. **(10 Marks)**

Module-5

9 a. What are the various methods of charging EV from grid ? **(10 Marks)**

b. Explain Z – converter for battery charging with a neat circuit diagram. **(10 Marks)**

OR

10 a. Explain transformer less topology for battery charging. **(10 Marks)**

b. Explain with a neat diagram, isolated bidirectional DC – DC converter. **(10 Marks)**

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