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CBCS SCHEME

USN

21EE752

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Electric Vehicles

Time: 3 hrs. Max. Marks: 100

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

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Write brief note on Roadways fundamentals. (06 Marks)
b. Explain Newtons second law of motion in vehicle mechanics. (07 Marks)
c. Write short notes on propulsion power and maximum gradability. (07 Marks)

OR

2 a. Explain in detail the constant FTR in level road condition with necessary equations. (10 Marks)
b. Write detailed notes on vehicle kinetics with necessary graphs. (10 Marks)

Module-2

3 a. With neat block diagram, explain the essential components of electric vehicles. (08 Marks)
b. With neat graph, briefly explain the traction motor characteristics of EV. (05 Marks)
c. Detail the concept of hybrid electric vehicles and its architecture. (07 Marks)

OR

4 a. Explain series hybrid electric drive trains with neat sketch. (10 Marks)
b. Explain parallel hybrid electric drive train with neat sketch. (10 Marks)

Module-3

5 a. Define the following battery parameters:
i) Discharge Rate
ii) State of charge
iii) State of discharge
iv) Depth of discharge (08 Marks)
b. Draw and explain the basic structure of battery and its major components. (06 Marks)
c. Briefly explain Lithium ion battery with neat sketch. (06 Marks)

OR

6 a. Write brief notes on fuel cell and explain its basic principle and operation. (08 Marks)
b. List the types of fuel cells. Explain any two types with neat sketch. (06 Marks)
c. Write short notes on super capacitor's (06 Marks)

Module-4

7 a. Explain the principle and operation of DC motor with neat sketch. Brief the two types of speed control in DC motor. (10 Marks)
b. Explain the operation of induction motor. Brief the concept of slip in induction motor. (10 Marks)

OR

8 a. List the advantages of BLDC motor. Explain the construction, working and principle of operation of BLDC motor with neat diagram. (10 Marks)

b. Write detailed notes on sensor less control. Briefly explain the principle of regenerative braking. (10 Marks)

Module-5

9 a. Explain the power rating design of series hybrid electric drive train in detail. (10 Marks)

b. Elaborate the control strategies of series hybrid electric drive train in detail. (10 Marks)

OR

10 a. Design the engine power capacity of parallel hybrid electric drive train. (10 Marks)

b. Explain the control strategies of parallel hybrid electric drive train. (10 Marks)

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