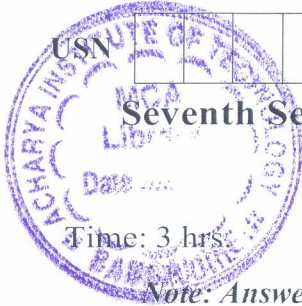


CBCS SCHEME

21EE752



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

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. With a neat sketch explain top-level perspective of an electric vehicle system. (10 Marks)
- b. With equation, explain non-constant and constant F_{TR} on level road. (10 Marks)

OR

- 2 a. Explain force velocity characterization and maximum gradiability. (10 Marks)
- b. Explain the dynamics of vehicle motion. Also explain tractive force. (10 Marks)

Module-2

- 3 a. With the sketch, explain traction motor characteristics. (10 Marks)
- b. Explain the concept of tractive effort in normal driving. (10 Marks)

OR

- 4 a. List the different architecture of HEV's and explain the series hybrid drive trains with neat diagram. (10 Marks)
- b. Discuss the variety of possible EV configuration due to variations in electric propulsion system and energy source with block diagram. (10 Marks)

Module-3

- 5 a. With a neat sketch, explain working principle of lead acid battery. (10 Marks)
- b. List the fuel cell types. Write a short note on super capacitors. (10 Marks)

OR

- 6 a. Explain components and working principle of a battery cells with neat diagram. (10 Marks)
- b. Explain the following battery parameters:
(i) Discharge note (ii) State of discharge (iii) Depth of discharge (iv) SOC. (10 Marks)

Module-4

- 7 a. Explain the operation of Switched Reluctance motor drive system. (10 Marks)
- b. Explain block diagram of the speed control of the BLDC motor. (10 Marks)

OR

- 8 a. Explain the functional block diagram of a typical electric propulsion motor. (10 Marks)
- b. With a neat sketch explain VVVF control and characteristics of induction motor drives. (10 Marks)

Module-5

- 9 a. Explain the configuration of a typical series hybrid electric drive train. (10 Marks)
- b. Explain Max-SOC of PPS control strategy. (10 Marks)

OR

- 10 a. Explain the configuration of the parallel torque – coupling hybrid drive train. (10 Marks)
- b. Explain concept of power rating design of traction motor and engine/generator. (10 Marks)

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