

Seventh Semester B.E. Degree Examination, Dec.2024/Jan.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. Explain the laws of motion and vehicle kinetics associated with vehicle dynamics. (10 Marks)
- b. Explain force velocity characteristics and maximum gradability. (10 Marks)

OR

- 2 a. Explain the concept of constant F_{TR} and level road. (10 Marks)
- b. Explain propulsion system design of EV. (10 Marks)

Module-2

- 3 a. With neat block diagram, explain the illustration of general EV configuration. (10 Marks)
- b. Explain tractive effort in normal driving. (10 Marks)

OR

- 4 a. With neat block diagram explain series hybrid electric drive train configuration. (10 Marks)
- b. With neat block diagram explain parallel hybrid electric drive train configuration. (10 Marks)

Module-3

- 5 a. With neat diagrams explain working of lead acid battery and nickel cadmium battery. (10 Marks)
- b. With neat diagrams, explain working of Li-ion battery and Li-polymer battery. (10 Marks)

OR

- 6 a. With neat diagram explain the basic operation of fuel cell. (10 Marks)
- b. With neat diagram, explain the operation of Alkaline fuel cell. (10 Marks)

Module-4

- 7 a. With neat diagram, explain the operation of chopper control of DC motors. (10 Marks)
- b. Explain permanent magnet Brushless DC motor drive train. (10 Marks)

OR

- 8 a. Explain switched reluctance motor drive system. (10 Marks)
- b. With neat diagram, explain torque control of the BLDC motor. (10 Marks)

Module-5

- 9 a. Explain different operation patterns of series hybrid electric drive train. (10 Marks)
- b. With necessary diagrams explain thermostat control strategy of series hybrid drive train. (10 Marks)

OR

- 10 a. Explain Max-SOC of PPS control strategy of parallel hybrid drive train. (10 Marks)
- b. Write a note on energy storage design. (10 Marks)

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.