

CBGS SCHEME



18EE752

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022

Electric Vehicle

Max. Marks: 100

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

Module-1

- 1 a. What are Electric Vehicles? List the features of electric vehicles along with top level perspective diagram. (10 Marks)
- b. Explain vehicle mechanics considering Newton's second law of motion. (06 Marks)
- c. Define: (i) Tractive force (ii) Road load force (04 Marks)

OR

- 2 a. Describe the laws of motion also mention power for i^{th} torque. (10 Marks)
- b. With equation, explain constant and non-constant F_{TR} on level road. (10 Marks)

Module-2

- 3 a. Explain components of conceptual illustration of general EV configuration. (10 Marks)
- b. With the sketch, explain traction motor characteristics. (10 Marks)

OR

- 4 a. Explain the classification of hybrid electric vehicles. (10 Marks)
- b. With a neat sketch, explain configuration of a parallel hybrid electric drive train. (10 Marks)

Module-3

- 5 a. Explain components of a battery cell with neat diagram. (10 Marks)
- b. List the major types of rechargeable batteries considered for EV and HEV. (06 Marks)
- c. Define battery pack and its significance. (04 Marks)

OR

- 6 a. With equations and sketch explain lead acid battery cell charge and discharge operation. (10 Marks)
- b. List the fuel cell types. (06 Marks)
- c. Write a note on super capacitors used as energy source in EV. (04 Marks)

Module-4

- 7 a. Explain the functional block diagram of a typical electric propulsion system. (10 Marks)
- b. With the equations, explain basic operation principle of induction motor. (10 Marks)

OR

- 8 a. Explain the advantages and disadvantages of BLDC motor. (10 Marks)
- b. With the block diagram, explain Switched Reluctance Motor drives. (10 Marks)

Module-5

- 9 a. Explain the configuration of a typical series hybrid electric drive train. (10 Marks)
- b. With the block diagram, explain overall control scheme of the parallel hybrid drive train. (10 Marks)

OR

- 10 a. Explain the configuration of the parallel torque-coupling hybrid drive train. (10 Marks)
- b. Explain the energy storage design. (10 Marks)

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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.