



Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024  
**Electric Vehicles**

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 mechanics. (10 Marks)
- b. Explain force velocity characteristics and maximum gradability. (10 Marks)

**OR**

- 2 a. Explain the concept of constant FTR and level roads. (10 Marks)
- b. Explain about 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. Write a note on traction motor characteristics. (10 Marks)

**OR**

- 4 a. Explain the concept of tractive effort in normal driving. (10 Marks)
- b. With neat diagram, explain the concept of Hybrid electric drive train. (10 Marks)

**Module-3**

- 5 a. With a neat diagram, explain the basic battery model. (10 Marks)
- b. With neat diagrams, explain the working of Lead acid battery and Nickel Cadmium battery. (10 Marks)

**OR**

- 6 a. With neat diagrams, explain the working of PEMFC and its operation. (10 Marks)
- b. With neat diagram, explain basic operation of super capacitors. (10 Marks)

**Module-4**

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

**OR**

- 8 a. Explain the operation of Switched Reluctance motor drive system. (10 Marks)
- b. With neat block diagram, explain induction motor drives. (10 Marks)

**Module-5**

- 9 a. Explain Max-SOC of PPS control strategy. (10 Marks)
- b. Write a note on power rating of traction motor. (10 Marks)

**OR**

- 10 a. With neat schematic diagram, explain control strategies of parallel hybrid drive train. (10 Marks)
- b. Write a note on 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.