

USN

--	--	--	--	--	--	--	--	--	--

18AU754

Seventh Semester B.E. Degree Examination, June/July 2023 Introduction to Electrical 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 need of electric drive. (06 Marks)
- b. Explain the historical development of electric vehicles. (08 Marks)
- c. Write the engineering philosophy of electric vehicle. (06 Marks)

OR

- 2 a. Write short notes on EV concept and key EV technologies. (10 Marks)
- b. Briefly explain recent development and development trends in Electric Vehicle technology. (06 Marks)
- c. Explain major issues of electric vehicles at present. (04 Marks)

Module-2

- 3 a. Explain the following terms : (12 Marks)
 - (i) Conductors
 - (ii) Insulators.
 - (iii) Resistors
 - (iv) Relays.
 - (v) Capacitors
 - (vi) Solenoids
- b. Explain construction and working principle of DC motor with sketch. (08 Marks)

OR

- 4 a. With neat sketch, explain working of AC motor. (10 Marks)
- b. Explain construction and working of DC generator with neat diagram. (10 Marks)

Module-3

- 5 a. Briefly explain the major components of battery operated electric vehicle with layout. (12 Marks)
- b. What is the function of flywheel? Describe how energy is stored using a flywheel. (08 Marks)

OR

- 6 a. Explain regenerative braking and energy flow during starting, driving and braking. (12 Marks)
- b. Discuss the basic diagnosis and precautions of the battery operated electric vehicle to carry out. (08 Marks)

Module-4

- 7 a. Explain the construction and working of lead acid battery with neat sketch. (10 Marks)
- b. What are the battery parameters? Explain briefly. (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.

OR

- 8 a. Sketch and explain the working of Lithium Ion and nickel metal hydride battery. (12 Marks)
- b. Explain briefly the following methods of battery rating:
- (i) Cold Cranking Amps (CCA)
 - (ii) Cranking Amps (CA)
 - (iii) Watt-hour (Wh)
 - (iv) Ampere-hour (Ah)
- (08 Marks)

Module-5

- 9 a. With neat block diagram, explain fuel cell EV system. (10 Marks)
- b. With neat sketch, explain alkaline fuel cell, clearly stating the chemical reactions. (10 Marks)

OR

- 10 a. Write short notes on :
- (i) Proton exchange membrane fuel cell. (10 Marks)
 - (ii) Solid oxide fuel cell. (06 Marks)
- b. Explain hydrogen storage systems and reformers. (04 Marks)
- c. Mention the challenges and solutions for hydrogen storage systems.
