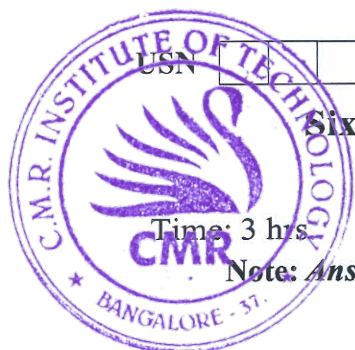


# CBCS SCHEME

18EE646



## Sixth Semester B.E. Degree Examination, Jan./Feb. 2023 Electric Vehicles Technologies

Time: 3 hrs.

Max. Marks: 100

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

### Module-1

- 1 a. Explain with neat sketch conceptual illustration of EV configuration. (07 Marks)
- b. Explain traction motors variable speed electric motor characteristics with neat sketch. (07 Marks)
- c. Sketch and explain rolling resistance and aerodynamic drag in electric vehicles. (06 Marks)

OR

- 2 a. Discuss briefly tructive effort in different representation in drive cycles. (07 Marks)
- b. Discuss with neat sketch conceptual illustration of a series and parallel hybrid electric drive train. (07 Marks)
- c. Discuss classification of hybrid electric vehicle. (06 Marks)

### Module-2

- 3 a. Define the terms state o discharge and depth of discharge. (06 Marks)
- b. With neat sketch explain lead li-ion-battery. (07 Marks)
- c. Discuss briefly importance, advantage and application and supercapacitor. (07 Marks)

OR

- 4 a. Explain major types of rechargeable in EV and HVE. (06 Marks)
- b. Sketch explain with neat diagram working operation of PEMFC. (10 Marks)
- c. Explain Peukert's equation with constant current discharge. (04 Marks)

### Module-3

- 5 a. Explain in detail functional block diagram of a typical electric propulsion. (10 Marks)
- b. Discuss in detail forward motoring and regenerative braking control using class C-Chopper. (10 Marks)

OR

- 6 a. With a neat diagram, explain the speed control of the BLDC motor. (10 Marks)
- b. With a neat diagram, explain switched reluctance motor drive. (10 Marks)

### Module-4

- 7 a. Explain in detail power rating of electric motor drive in series HEV – Speed – Torque characteristics. (10 Marks)
- b. Explain in detail control strategies of parallel Hybrid drive train. (10 Marks)

OR

- 8 a. With a neat block diagram, explain a typical series hybrid electric drive train. (10 Marks)
- b. Discuss in detail facts follow in design of electric motor drive capacity. (10 Marks)

### Module-5

- 9 a. Define the term battery charging and termination. Name different methods of battery charging. (10 Marks)
- b. Discuss briefly Z – source converter for EV and HEV. (10 Marks)

OR

- 10 a. Explain with a neat diagram, isolated bidirectional DC – DC converter. (10 Marks)
- b. Explain importance of power electronics converters for battery charging. (10 Marks)

\* \* \* \* \*

CMRIT LIBRARY  
BANGALORE - 560 037

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.