CBCS SCHEME

USN | | | | | | | | | | |

18EE752

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

Time: 3 hrs. 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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