CBCS SCHEME

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

18EE752

Seventh Semester B.E. Degree Examination, June/July 2025
Electric Vehicles

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Enumerate in detail on constant and non-constant FTR with supporting equations. **(10 Marks)**

b. Representing rolling resistance and different forces acting on vehicle- represent forces, draw phases and enumerate on F_{coll} under different conditions. **(10 Marks)**

OR

2 a. Define propulsion power and plot V(t) versus time graph. Explain with relevant equations. **(10 Marks)**

b. Describe the Laws of Motion. **(06 Marks)**

c. What are the compelling impetus to develop and adopt EVs. **(04 Marks)**

Module-2

3 a. With a neat block diagram illustrate three major subsystems of EV and explain their working. **(10 Marks)**

b. Explain the following :
i) Hybrid Traction
ii) Regenerative braking **(10 Marks)**

OR

4 a. With detailed diagram explain the complete working of parallel hybrid drive train. **(10 Marks)**

b. With Power – Torque characteristics, illustrate different gear operation for x = 2, x = 4, x = 6. Explain the concept **(10 Marks)**

Module-3

5 a. Paraphrase on electro chemical batteries and explain each part of it. **(10Marks)**

b. What is constant current discharge model of PEMFC, support with relevant equations. **(10 Marks)**

OR

6 a. Define :
i) Specific energy ii) Specific power
iii) Energy density iv) Battery capacity
v) Battery efficiency **(10 Marks)**

b. Explain SoC and SoD with circuit and equations. **(10 Marks)**

Module-4

7 a. Explain typical electric propulsion system with functional block diagram. **(10 Marks)**

b. How does chopper control method of DC motor work. **(10 Marks)**

OR

8 a. Brief on extended speed technology for PM hybrid motors. **(10 Marks)**

b. How indirect rotor flux orientation scheme can be employed to control motor. **(10 Marks)**

Module-5

9 a. Enumerate on major components of series hybrid drive train along with their sizing. **(12 Marks)**

b. What are the different control strategies of series hybrid drive train. **(08 Marks)**

OR

10 a. What are different control strategies for parallel hybrid drive train. **(10 Marks)**

b. Brief on steps for design of transmission system. **(10 Marks)**

* * * * *