CBCS SCHEME

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

BEE755A

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Electric Vehicle Technologies

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain speed ratio and the performance of electric vehicle using speed power characteristics.	10	L2	CO1
	b.	Explain the concept of hybrid electric drive trains and list the different architectures of HEV.	10	L2	CO1
		OR			
Q.2	a.	What are the factors that effects the vehicle performance.? And explain tractive effort.	10	L2	CO1
	b.	Describe the energy consumption in electric vehicle.	10	L2	CO1
		Module – 2			
Q.3	a.	Explain various operating patterns of a series hybrid electric train for its optimal operation.	10	L2	CO2
	b.	Explain the power rating design of Traction Motor And engine generator in series HEV.	10	L2	CO2
		OR			
Q.4	a.	Explain the control strategy of series hybrid electric drive train.	10	L2	CO2
	b.	With the block diagram explain overall control scheme of the parallel hybrid drive train.	10	L2	CO2
		Module – 3			
Q.5	a.	Explain the following battery parameters. i. Battery capacity ii. Discharge rate iii. State of Charge (SoC) iv. Specific power v. State of Discharge (SoD).	10	L2	CO3
	b.	List the different types of fuel cells and explain the working of proton exchange membrane fuel cell.	10	L2	CO3

OR

Q.6	a.	Draw and explain the fuel cell characteristics.	10	L2	CO3
	b.	Explain the charging and cell discharge operation of a lead acid battery with chemical reaction equations.	10	L2	CO3

Module – 4

Q.7	a.	With a neat diagram explain power stages in three phase DC fast charger.	8	L2	CO4
	b.	What is microgrid and explain operations of hierarchical control?	8	L2	CO4
	c.	Compare the different AC and DC charging levels with respective power capabilities.	4	L2	CO4

OR

Q.8	a.	With a neat diagram explain the working of power electronic converter for V2H and H2V.	8	L2	CO4
	b.	Explain the coordinated control of solar PV generation, storage and PEV.	8	L2	CO4
	c.	Write short notes on impact of fast charger on power grid.	4	L2	CO4

Module – 5

Q.9	a.	Explain the working of vehicle supervisory controller.	10	L2	CO5
	b.	Explain series parallel 2×2 architecture of hybrid mode electric vehicle.	10	L2	CO5

OR

Q.10	a.	Explain any two possible modes of operation in mechanical power split hybrid vehicle.	10	L2	CO5
	b.	Explain regeneration mode of operation in hybrid electric vehicle.	10	L2	CO5

* * * * *