

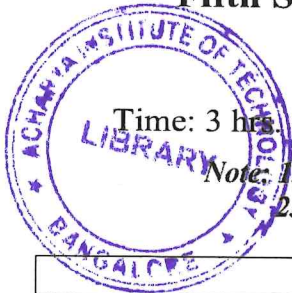
CBCS SCHEME

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BEE515C

Fifth Semester B.E./B.Tech. Degree Examination, June/July 2026 Electric Vehicle Fundamentals



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.	What are the major components of on Electric Vehicle and mention their specific function in the propulsion system.	07	L2	CO1
	b.	Explain the concept of battery and discuss various types of batteries used in electric vehicles.	07	L2	CO1
	c.	Describe the reason for the global lift towards electric vehicle. Highlights environmental, social and economic benefits over IC engine vehicles.	06	L2	CO1
OR					
Q.2	a.	Discuss how high voltage and low voltage cables are used in electric vehicles and mention what safety consideration must be followed during their installation?	07	L2	CO1
	b.	What is an ultra – capacitor and how does it differ from a conventional battery.	06	L2	CO1
	c.	Illustrate the alternative charging sources which are available for EV's and how do their benefits and limitation impacts their adoption.	07	L2	CO1
Module – 2					
Q.3	a.	Explain the Construction of 3 ϕ Induction motor and mention its types.	10	L2	CO2
	b.	With neat diagram, explain the maximum state of change of PPS control strategy of series HEDT.	10	L2	CO2
OR					
Q.4	a.	Draw the neat diagram of parallel HEDT and how does mechanical coupling work within this system.	10	L2	CO2
	b.	Describe the constructional feature of a SRM. How do these feature influence its performance? Mention the advantages of SRM over conventional machines.	10	L2	CO2
Module – 3					
Q.5	a.	What is the Modulated Signal Injection Method used for sensor less control, and how does it operate.	10	L2	CO3
	b.	Identify and describe the basic electronic components utilized in electric vehicle. How they contribute to the vehicle performance and efficiency.	10	L2	CO3

OR

Q.6	a.	Discuss the major risk involved in handling and operating electric vehicles. Describe the safety precautions and high voltage protection measures that must be implemented.	10	L2	CO4
	b.	What are the types of sensors used in autonomous electric vehicles and self – driving cars, and how can there system be vulnerable to hacking?	10	L2	CO3

Module – 4

Q.7	a.	With a neat diagram, explain the configuration of a series hybrid electric drive train.	10	L2	CO4
	b.	Define a Hybrid Electric Vehicle system. Discuss the various types of control mechanism used to optimize the performance with their operational analysis.	10	L2	CO4

OR

Q.8	a.	Explain the principle of regenerative braking and mention its impact of the overall energy efficiency of hybrid vehicle.	10	L2	CO4
	b.	Explain the different architecture used in hybrid electric drive systems.	10	L2	CO4

Module – 5

Q.9	a.	What is Fuel Cell? Explain the working principle with a neat diagram and discuss the advantages, limitations and obstacles in associated with fuel cell technology.	10	L2	CO5
	b.	Explain the various factors that influences the life time cost of a Fuel Cell Vehicle (FCV). How do the system design, components and maintenance requirements contribute to the total cost ?	10	L2	CO5

OR

Q.10	a.	Briefly explain the types of Fuel Cell technologies.	10	L2	CO5
	b.	Analyze how efficiency, durability and specific power output influence the design consideration of fuel cell used in electric vehicle.	10	L4	CO5
