CBCS SCHEME

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BEE515C

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.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.	Explain the need for Electric and Hybrid vehicles.	05	L1	CO1
	b.	What are the factors to be considered for the cost of Electric Vehicles.	05	L2	CO1
	c.	With a neat sketch give the layout of Electric Vehicles and explain the various components of Electric Vehicles.	10	L2	CO1
		OR			
Q.2	a.	What are the types of Batteries used in Electric Vehicles and what is charging process.	05	L2	CO1
	b.	Explain the different types of Charging Methods.	05	L1	CO1
	c.	With a neat sketch explain the construction of ultra capacitors. What are the strength and weakness of ultra capacitors.	10	L2	CO1
		Module – 2			
Q.3	a.	Give the difference between Brushed DC motor and Brushless DC motor.	05	L2	CO2
	b.	With a neat sketch explain series Hybrid Electric device train (Electric coupling) and mention the various operating modes.	10	L2	CO2
	c.	Explain the construction and principle of operation of DC motor.	05	L1	CO2
		OR			
Q.4	a.	With a neat sketch explain Switched Reluctance Motor (SRM) and mention its advantages and disadvantages.	10	L2	CO2
	b.	With a neat sketch explain the mechanical coupling of parallel Hybrid drive train.	10	L2	CO2
		Module – 3			
Q.5	a.	Explain the various Basic Electronic Components used in Electric Vehicles.	08	L1	CO3
	b.	Write a note on autonomous Electric Vehicles Cars and Self Drive Cars.	06	L2	CO3
	c.	Write a note on High voltage safety, Guidance and precautions to be taken in Electric Vehicles.	06	L2	CO3
		OR			
Q.6	a.	Write a note on Hacking and Safety Guidance of EV (Electric Vehicles).	08	L2	CO3
	b.	Explain in Sensorless Control Method. i) Phase Flux Linkage based Method ii) Phase Inductance based Method iii) Modulated Signal Injection Method iv) Mutually Induced Voltage Method v) Observer based Method	12	L1	CO3

		Module – 4			
Q.7	a.	What are Hybrid Electric Vehicles. Explain the classification of Hybrid Electric Vehicles.	10	L2	CO4
	b.	With a neat sketch explain the architecture of series and parallel Hybrid Electric Vehicles.	10	L3	CO4
		OR			
Q.8	a.	Explain the Regenerative breaking in Hybrid Electric Vehicle.	10	L2	CO4
	b.	Explain the advantages and disadvantages of plug in Hybrid Electric Vehicle.	05	L1	CO4
	c.	What is noise vibration in Electric Vehicle and how it can be reduced.	05	L2	CO4
		Module – 5			
Q.9	a.	What is a fuel cell. Mention its advantages and disadvantages.	06	L2	CO5
	b.	Explain the components of fuel cells and its operations.	08	L2	CO5
	c.	Give the classification of the fuel cells. Mention the Electrolyte used.	06	L2	CO5
		OR			
Q.10	a.	What are the obstacles for usages of fuel cell's.	05	L2	CO5
	b.	Explain the performance of fuel cell using I – V curve and power Density curve.	10	L3	CO5
	c.	Explain the fuel system characteristics and its maintenances.	05	L2	CO1

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