CBCS SCHEME

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BEE515C

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025

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.	Why are Electric Vehicles (EVs) needed and what are their environmental benefits compared to traditional IC engine vehicles?	7	L1	CO1
	b.	What are the main components of Electric Vehicle (EV) technology, and how do they work together?	7	L1	CO1
	c.	What are the different types of EV batteries and what are their advantages and disadvantages.	6	L1	CO1
		OR			
Q.2	a.	What is an ultra capacitor and how does it compare to batteries in EV's?	7	L1	CO1
	b.	What are the alternate charging sources of EVs and what are the benefits and limitations of each?	7	L1	CO1
	c.	What happens to EVs and their battery at the end of their life and what are the challenges?	6	L1	CO1
		Module – 2			
Q.3	a.	Explain in detail about the construction and control of BLDC motor.	10	L1	CO2
	b.	Draw the neat diagram of series HEDT and how does electrical coupling work within this system (operating modes)?	10	L1	CO2
		OR			
Q.4	a.	What is a Switched Reluctance Motor (SRM) and explain about its structural characteristics and give the advantages.	10	L2	CO2
	b.	What is Peak Power Source (PPS) in HEDT and why are these elements critical?	10	L2	CO2
		Module – 3			
Q.5	a.	What are the basic electronic devices used in electric vehicles and what are their functions in EV systems.	10	L2	CO3
	b.	What are the main safety risks associated with high voltage in EVs and what precautions should be taken?	10	L2	CO3

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		OR			
Q.6	**a.**	What are the main security risks for autonomous EVs, and how can they be protected from hacking?	**10**	**L2**	**CO3**
	b.	What is the phase flur linkage-based method for sensor-less control and how does it work?	**10**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	What are Hybrid Electric Vehicles (HEVs) and how are they classified?	**10**	**L3**	**CO4**
	b.	Explain about propulsion systems and components in detailed.	**10**	**L3**	**CO4**
		OR			
Q.8	**a.**	What is regenerative braking and how does it contribute to the efficiency of Hybrid vehicles?	**10**	**L2**	**CO4**
	b.	Explain about fuel economy, vibration and noise reduction in Hybrid vehicles.	**10**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	What is the significance of the I-V curve in fuel cells and how does it relate to fuel cell performance?	**10**	**L2**	**CO5**
	b.	Explain fuel cell characteristics and how do factors like efficiency, durability and specific power impact their design for electric vehicles.	**10**	**L2**	**CO5**
		OR			
Q.10	**a.**	How is the power design of a fuel cell vehicle structured and what is freeze capacity in the context of fuel cell vehicles?	**10**	**L2**	**CO5**
	b.	What are the lifetime costs associated with fuel cell vehicles and explain about components and maintenance of fuel cell.	**10**	**L2**	**CO5**

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