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BME306A

Third Semester B.E./B.Tech. Degree Examination, June/July 2025

Electric and Hybrid Vehicle Technology

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.	Discuss the history of hybrid electric vehicles. Dissect the environmental importance of EV and their social impacts.	10	L2	CO1
	b.	Enlist the different architectures of hybrid electric drive train and explain the series hybrid electric drive train.	10	L2	CO1
OR					
Q.2	a.	State and explain the dynamic equations of vehicle motion.	10	L2	CO1
	b.	Under what condition a pure EV can be chosen as a better option compared to hybrid vehicles considering the impact on climate change.	10	L2	CO1
Module – 2					
Q.3	a.	Elaborate energy management system and issues of energy management strategies of EHV.	10	L2	CO2
	b.	Classify and explain the different energy management strategies.	10	L2	CO2
OR					
Q.4	a.	Explain fuel cell and fly wheel as energy source elements in electric and hybrid electric vehicles.	10	L2	CO2
	b.	Explain battery management system in electric and hybrid vehicles.	10	L2	CO2
Module – 3					
Q.5	a.	Discuss the types of electrical motors used in electric and hybrid vehicles.	10	L2	CO3
	b.	Explain the types of induction motor drives and their control characteristics.	10	L2	CO3
OR					
Q.6	a.	Discuss Brushes and Brushless DC motors and their characteristics.	10	L2	CO3
	b.	Explain about IPM motor drives and their characteristics.	10	L2	CO3
Module – 4					
Q.7	a.	Explain design parameters of batteries, ultra capacitors used in hybrid electrical vehicles.	10	L2	CO4
	b.	Summarize the aero-dynamic shape considerations while designing the EV and HEV.	10	L2	CO4
OR					
Q.8	a.	Explain the working principle of fuel cell and its analysis.	10	L2	CO4
	b.	Explain the rolling resistance and aero-dynamic drag in vehicles.	10	L2	CO4
Module – 5					
Q.9	a.	Explain the battery smart charging system in electric vehicle technology.	10	L2	CO5
	b.	Discuss the battery charging stations and its installation and commissioning.	10	L2	CO5
OR					
Q.10	a.	Discuss the estimation on station capacity and associated technical issues in electric battery charging system.	10	L2	CO5
	b.	Describe the different types of connectors used for charging electrical batteries.	10	L2	CO5
