

Code: 19EE4801B

IV B.Tech - II Semester – Regular Examinations – MAY 2023

**HYBRID ELECTRIC VEHICLES
(ELECTRICAL & ELECTRONICS ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

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- Note: 1. This question paper contains two Parts A and B.
 2. Part-A contains 5 short answer questions. Each Question carries 2 Marks.
 3. Part-B contains 5 essay questions with an internal choice from each unit. Each question carries 12 marks.
 4. All parts of Question paper must be answered in one place.

BL – Blooms Level

CO – Course Outcome

PART – A

		BL	CO
1. a)	List out the advantages of electric vehicles over conventional vehicles.	L1	CO1
1. b)	Define Tractive effort.	L1	CO1
1. c)	List the electric components used in hybrid vehicles.	L1	CO3
1. d)	Recall the disadvantages of lead acid battery.	L1	CO4
1. e)	Briefly describe the significance of power electronics in electric vehicles.	L1	CO5

PART – B

			BL	CO	Max. Marks
UNIT-I					
2	a)	Discuss the evolution of hybrid electric vehicles.	L2	CO2	6 M

	b)	Derive & explain the dynamic equation of an electric vehicle.	L2	CO2	6 M
OR					
3	a)	Discuss social and environmental impacts of electric vehicles.	L2	CO2	6 M
	b)	Write a short note on vehicle movement.	L2	CO2	6 M
UNIT-II					
4	a)	Explain the concept of Hybrid Electric drive trains with a neat sketch.	L2	CO2	6 M
	b)	Explain the performance of an electric vehicle.	L2	CO2	6 M
OR					
5	a)	Draw and explain the topologies of hybrid electric drive train.	L2	CO2	6 M
	b)	Discuss the tractive effort in normal driving in electric vehicles.	L2	CO2	6 M
UNIT-III					
6	a)	Analyse the various controls in DC motor drives.	L4	CO3	6 M
	b)	Interpret the control of Induction Motor drives.	L3	CO3	6 M
OR					
7	a)	Illustrate the PMSM drives working and operation in electric vehicles.	L3	CO3	6 M
	b)	Demonstrate the SRM drives working in electric vehicles.	L3	CO3	6 M

UNIT-IV					
8	a)	Compare lead-acid, Nickel and Lithium-ion batteries.	L2	CO4	6 M
	b)	Illustrate the fuel cell system characteristics.	L3	CO4	6 M
OR					
9	a)	Explain the working and operating principle of fuel cell.	L2	CO4	6 M
	b)	Illustrate the hybridization of energy storage in battery and ultra-capacitor.	L3	CO4	6 M
UNIT-V					
10	a)	Demonstrate the AC/DC conversion in electric vehicles.	L3	CO5	6 M
	b)	Analyse the thermal management of HEV using Power Electronics.	L4	CO5	6 M
OR					
11	a)	Demonstrate the DC/AC conversion in electric vehicles.	L3	CO5	6 M
	b)	Analyze electronic devices used for control and distribution of electric power.	L4	CO5	6 M