

Code No: R204102M

R20

SET - 1

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY GURAJADA VIZIANAGARAM
IV B. Tech I Semester Advanced Supplementary Examinations March 2025
FUNDAMENTALS OF ELECTRIC VEHICLES

(Open Elective)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from Each unit
 All Questions Carry Equal Marks

		UNIT-I	
1.	a)	List and explain the basic constituents of a Conventional Vehicle.	[7M]
	b)	Draw and explain the basic system level diagram of an Electric Vehicle.	[7M]
		(OR)	
2.	a)	Explain how the engine and transmission system are connected in a conventional vehicle.	[7M]
	b)	Distinguish in detail between a Electric vehicle, Hybrid Electric Vehicle and Plug in hybrid vehicle?	[7M]
		UNIT-II	
3.	a)	Explain the motor drive with a neat block diagram.	[7M]
	b)	Describe the working of boost converter used in Electric vehicles with a neat circuit?	[7M]
		(OR)	
4.	a)	Explain how the rectifier is used in Electric vehicles with a neat schematic.	[7M]
	b)	Describe how Voltage source inverter are used in Electric vehicles to control the electric motors and generators?	[7M]
		UNIT-III	
5.		What are the different constituents of Hybrid Electric drive and Explain it with a neat system level diagram.	[14M]
		(OR)	
6.	a)	Explain the basic architecture of Hybrid Electric vehicles.	[7M]
	b)	Explain in detail about the Series Hybrid Electric vehicle with a neat block diagram.	[7M]
		UNIT-IV	
7.	a)	Explain the various characteristics to be required for a traction drive.	[7M]
	b)	Analyze brush less DC Motors and how they are different w.r.t DC Motors?	[7M]
		(OR)	
8.	a)	Explain how induction machines are used in Electric Vehicles.	[7M]
	b)	Explain the significance of carrying out thermal analysis of Traction motors used in Electric vehicles.	[7M]
		UNIT-V	
9.	a)	Draw and explain the components of the battery cell.	[7M]
	b)	Explain detail about the operation of a Lithium ion cell.	[7M]
		(OR)	
10.	a)	Explain the charge and discharge operation of the Lead acid battery.	[6M]
	b)	Explain the following: i) Ultra capacitors and ii) Flywheels	[8M]
