

GUJARAT TECHNOLOGICAL UNIVERSITY**BE(MINOR)- SEMESTER-I&II EXAMINATION – SUMMER 2025****Subject Code:115AL01****Date:03-06-2025****Subject Name: Power Electronics for Electrical Vehicles****Time:02:30 PM TO 05:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		Marks
Q.1	(a) List and draw the symbols of Power Electronics components used in converters for Electric vehicles.	03
	(b) Explain construction, working and characteristic of MOSFET.	04
	(c) Explain full wave-controlled rectifier with clear waveform.	07
Q.2	(a) Give classification of electric motor drives for EV and HVE applications.	03
	(b) Draw and Explain induction motor characteristics.	04
	(c) Explain switching states of two quadrant chopper.	07
	OR	
	(c) Explain ideal six switch voltage source inverter.	07
Q.3	(a) What is Drive train for Electric Vehicle?	03
	(b) Elaborate the working of SRM with neat and clean diagram.	04
	(c) Write a short note on Electronically Commutated motors used in Electric Vehicle.	07
	OR	
Q.3	(a) Draw and Explain PMDC motor characteristics.	03
	(b) Explain principle and construction PMSM motor.	04
	(c) What is Series Hybrid Drive Train? Draw neat figures and explain	07
Q.4	(a) Give classification of electronic converter.	03
	(b) What is fuel Cell? Write advantages of it compared to other energy sources used in Electric Vehicle.	04
	(c) Write a difference between Voltage source Inverter and Current source Inverter?	07
	OR	
Q.4	(a) Define DC-DC converter with it's types.	03
	(b) State of Charge (SoC) Estimation, Battery state of Health (SoH), Battery Depth of Discharge- explain these terms.	04
	(c) Explain three phase full controlled rectifier with suitable circuit diagram and output waveforms.	07
Q.5	(a) Give types of battery. Explain working of lithium ion battery.	03
	(b) Explain basic principle of ultra capacitor.	04
	(c) Explain battery management methods and devices.	07
	OR	
Q.5	(a) What are the main issues with fuel cell application in electric vehicles?	03
	(b) Explain basic principle of flywheel energy storage system.	04
	(c) Elaborate how control system functions in hybrid electrical vehicles.	07
