

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V EXAMINATION – SUMMER 2025

Subject Code:3152410

Date:17-05-2025

Subject Name:Power Electronics in Consumer Products

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 explain the main components of power electronic systems in consumer products.	03
(b) State the advantages of using PE in toys and electronic gadgets.	04
(c) Discuss the role of Power Electronics in home automation.	07
Q.2 (a) Explain how solar-based lights work.	03
(b) Define the role of PE in wireless charging systems.	04
(c) Draw block diagram of UPS and explain role of power electronics in it.	07
OR	
(c) Describe how small rooftop solar power plants integrate with PE converters.	07
Q.3 (a) Describe the use of PE in air conditioners.	03
(b) Describe how fluorescent lights are replaced by LED systems using PE.	04
(c) With proper diagram, explain the working of induction cooktop/plate.	07
OR	
Q.3 (a) State the benefits of power electronics in room heaters.	03
(b) Explain the role of power electronics in stabilizers.	04
(c) Discuss various lighting applications of PE and their impact on energy efficiency.	07
Q.4 (a) Draw the basic block diagram of a solar inverter.	03
(b) Describe the role of PE in microwaves.	04
(c) Compare Conventional Air Conditioner with inverter Air Conditioner.	07
OR	
Q.4 (a) Explain MCB, and state how does it differ from an ELCB.	03
(b) List and explain two examples of motor-based consumer products using PE converters.	04
(c) Discuss how power electronics play a crucial role in renewable energy applications like rooftop solar and wind power plants.	07
Q.5 (a) Describe the role of PE converters in enhancing the performance of commercial lighting systems.	03
(b) List and explain two applications of power electronics in the agricultural sector.	04
(c) Explain the integration of PE converters in electric vehicles and their impact on performance.	07
OR	
Q.5 (a) State the role of power electronics converters in quadcopters and drones.	03
(b) Discuss the challenges of using power electronics in consumer products.	04

- (c) State the requirement and importance of regulated power supplies. Describe the role of power electronics in regulating power supply for various consumer products. **07**
