

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – WINTER 2023****Subject Code:3160514****Date:07-12-2023****Subject Name: Green Technology and sustainable Development****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) Discuss Green Processes in detail.	03
	(b) Define process intensification (PI) and explain the role of PI in sustainable development.	04
	(c) Enlist the 12 principles of Green Chemistry. Explain any three in detail.	07
Q.2	(a) Enlist the 17 sustainable goals.	03
	(b) Discuss three pillars of sustainability.	04
	(c) Describe sustainability challenges and possibilities for major technical systems and for their transformation to meet sustainability requirements.	07
	OR	
	(c) What are the measures for overcoming the challenges of sustainable development goals?	07
Q.3	(a) Explain the concept of cleaner production (CP).	03
	(b) Discuss the Environmental Management Hierarchy.	04
	(c) Discuss CP case studies: Ammonical nitrogen recovery from wastewater.	07
	OR	
Q.3	(a) Write the definition of Cleaner Production and Waste.	03
	(b) Discuss the merits and demerits of CP.	04
	(c) Enlist Cleaner Production tools and Discuss them in detail.	07
Q.4	(a) Define green oxidation reaction with a suitable example.	03
	(b) Describe the synthesis of Dimethyl Carbonate as a green reagent in the chemical industry.	04
	(c) Explain the concept of green nanotechnology with suitable examples.	07
	OR	
Q.4	(a) Define photochemical reactions with suitable examples.	03
	(b) Explain why using reactions with a high atom economy is important for sustainable development.	04
	(c) Explain the benefits and limitations of ultrasound & microwave-assisted reactions toward sustainable development.	07
Q.5	(a) Discuss the green laws compliance.	03
	(b) Define ionic liquid with suitable examples.	04
	(c) Explain the greener approach towards the reduction of pollution for polymer and textile industries.	07
	OR	
Q.5	(a) Discuss the importance of green solvents.	03
	(b) Describe the synthesis of green reagents with a suitable example.	04
	(c) Explain the greener approach towards the reduction of pollution for pharmaceutical and dye industries.	07
