

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2024****Subject Code:3160514****Date:20-05-2024****Subject Name:Green Technology and sustainable Development****Time:10:30 AM TO 01:00 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.

		<b>MARKS</b>
<b>Q.1</b>	(a) Explain the concept of Process Intensification.	<b>03</b>
	(b) Discuss the role of a chemical engineer in Green Technology and Sustainable Development.	<b>04</b>
	(c) Enlist all 17 Sustainable Development Goals (SDGs) and explain any three goals in details.	<b>07</b>
<b>Q.2</b>	(a) Enlist the principles of Green Chemistry.	<b>03</b>
	(b) Explain the concept of Green Nanotechnology.	<b>04</b>
	(c) Discuss how a systems approach helps in achieving sustainable development goals.	<b>07</b>
	<b>OR</b>	
	(c) Discuss the various challenges in achieving sustainability.	<b>07</b>
<b>Q.3</b>	(a) Explain briefly the three principal dimensions of Sustainable Development.	<b>03</b>
	(b) Explain briefly about Supercritical CO <sub>2</sub> as a green solvent.	<b>04</b>
	(c) Discuss the greener approaches for pollution reduction in polymer and pesticides industries.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Explain the concept of Cleaner Production (CP).	<b>03</b>
	(b) Explain the importance of Ultrasound assisted reactions towards green synthesis.	<b>04</b>
	(c) Discuss the greener approaches for pollution reduction in textile and dyes industries.	<b>07</b>
<b>Q.4</b>	(a) Enlist the tools used for cleaner production.	<b>03</b>
	(b) Explain the methodology involved for effectively carrying out cleaner production.	<b>04</b>
	(c) Explain the merits and demerits of cleaner production in process industries.	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) Write a short note on the relation between Cleaner Production (CP) and Energy Management System (EMS).	<b>03</b>
	(b) Describe in brief the role of cleaner production in achieving sustainability.	<b>04</b>
	(c) Discuss the role of industries, government, and institutions in successful implementation of cleaner production.	<b>07</b>

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| <b>Q.5</b> | (a) Write a short note on Photochemical reactions.   | <b>03</b> |
|            | (b) Explain the Green laws compliance with suitable example.   | <b>04</b> |
|            | (c) Discuss in detail the application of cleaner production principles in relation to the reuse of liquid industrial waste from many industries. | <b>07</b> |

**OR**

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| <b>Q.5</b> | <b>(a)</b> | Discuss briefly about the role of Ionic Liquids in green synthesis.  | <b>03</b> |
|            | <b>(b)</b> | Write a short note on Green Productivity and emerging technologies.  | <b>04</b> |
|            | <b>(c)</b> | Discuss in detail the application of cleaner production principles in relation to the recovery of Ammoniacal Nitrogen from wastewater. | <b>07</b> |

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