

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE- SEMESTER-VI (NEW) EXAMINATION – WINTER 2024**

**Subject Code:3160514**

**Date:28-11-2024**

**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.

		<b>Marks</b>
<b>Q.1</b>	(a) Explain the role of chemical engineering in green technology.	<b>03</b>
	(b) Explain why using reactions with high atom economy is important for sustainable development.	<b>04</b>
	(c) Discuss the classification of Process intensification with suitable example.	<b>07</b>
<b>Q.2</b>	(a) Explain the concept of Green Nanotechnology.	<b>03</b>
	(b) Describe the synthesis of Dimethyl Carbonate as a green reagent in chemical industry.	<b>04</b>
	(c) Explain the three principal dimensions of sustainable development with suitable examples.	<b>07</b>
	<b>OR</b>	
	(c) What are the measures for overcoming the challenges of sustainable development goals?	<b>07</b>
<b>Q.3</b>	(a) Explain the concept of cleaner production (CP).	<b>03</b>
	(b) Define green oxidation reaction with a suitable example.	<b>04</b>
	(c) Explain the greener approach towards reduction of pollution for dyes and pesticides industries.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Enlist the three principal dimensions of Sustainable Development.	<b>03</b>
	(b) Explain the concept of green nanotechnology.	<b>04</b>
	(c) Explain the greener approach towards reduction of pollution for waste water industries and textile industries.	<b>07</b>
<b>Q.4</b>	(a) Discuss the benefits of Good House Keeping.	<b>03</b>
	(b) Enlist cleaner production tools and discuss their methodology and applications.	<b>04</b>
	(c) Discuss process change as 'Source of Waste reduction'.	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) Define photochemical reactions with suitable examples.	<b>03</b>
	(b) Explain the importance of Ultrasound assisted reactions towards green synthesis.	<b>04</b>
	(c) Discuss cleaner production with reference to wastewater minimization in Diethyl Malonate production.	<b>07</b>
<b>Q.5</b>	(a) Discuss the importance of green solvents	<b>03</b>
	(b) Explain the Environmental Management Hierarchy.	<b>04</b>

- (c) Describe the “Principles of Process Optimization” to achieve Waste Minimization in a plant producing “Vinyl Acetate (VA)”. **07**

**OR**

- Q.5** (a) Discuss the type of energy Audit. **03**  
(b) Discuss one unit operation in detail which can help create a cleaner product **04**  
(c) Discuss in detail applications of “Cleaner Production Principles” with special reference to liquid effluent waste minimization for the following industrial products: (1) H-acid & (2) Paracetamol. **07**

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