

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2022****Subject Code:3160514****Date:06/06/2022****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..

| | | MARKS |
|------------|--|--------------|
| Q.1 | (a) Explain the role of chemical engineering in green technology. | 03 |
| | (b) Discuss in brief about major challenges for implementing green technology in a chemical industry. | 04 |
| | (c) Enlist the twelve principles of green chemistry and discuss them in detail. | 07 |
| Q.2 | (a) Define ionic liquid with suitable example. | 03 |
| | (b) Describe the synthesis of Dimethyl Carbonate as a green reagent in chemical industry. | 04 |
| | (c) Explain the importance of Microwave and Ultrasound assisted reactions towards green synthesis. Give example of anyone. | 07 |
| | OR | |
| | (c) Explain the importance of green solvents towards green synthesis with few examples. | 07 |
| Q.3 | (a) Define process intensification. | 03 |
| | (b) Explain the concept of Sustainable Development | 04 |
| | (c) Explain the greener approach towards reduction of pollution for polymer and textile industries. | 07 |
| | OR | |
| Q.3 | (a) Enlist the three principal dimensions of Sustainable Development. | 03 |
| | (b) Explain the concept of green nanotechnology. | 04 |
| | (c) Explain the greener approach towards reduction of pollution for pharmaceutical and dyes industries. | 07 |
| Q.4 | (a) Explain the concept of cleaner production (CP). | 03 |
| | (b) Discuss the environmental management hierarchy with reference to cleaner production. | 04 |
| | (c) Discuss cleaner production with reference to wastewater minimization in Diethyl Malonate production. | 07 |
| | OR | |
| Q.4 | (a) Explain the various barriers and motivators in cleaner production. | 03 |
| | (b) Enlist cleaner production tools and discuss their methodology and applications. | 04 |
| | (c) Discuss role of cleaner production in survival and sustainable development of chemical industries. | 07 |
| Q.5 | (a) Discuss in brief the green laws compliance. | 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 production of Paracetamol. | 07 |
| | | OR | |
| Q.5 | (a) | Enlist the various responsibilities for action of companies towards cleaner production. | 03 |
| | (b) | Discuss energy conservation as a tool for cleaner production | 04 |
| | (c) | Describe the “Principles of Process Optimization” to achieve Waste Minimization in a plant producing “Vinyl Acetate (VA)”. | 07 |
