

October 2025
B.A./B.Sc.
Fifth Semester
DISCIPLINE SPECIFIC ELECTIVE – 2
CHEMISTRY
Course Code: CHD 5.21
(Green Chemistry)

Total Mark: 70
Time: 3 hours

Pass Mark: 28

Answer five questions, taking one from each unit.

UNIT-I

1. (a) How will you minimise hazardous substance in green chemistry? 4
- (b) Discuss the principles of green chemistry with examples. 7
- (c) Write a note on the prevention of waste and by-products in green chemistry. 3

2. (a) What are the main obstacles in the pursuit of the goals of green chemistry? 4
- (b) Explain the application of atom economy for addition and substitution reactions. 6
- (c) Give your opinion on designing a green synthesis using the principles of green chemistry. 4

UNIT-II

3. (a) Discuss the alternative sources of energy with respect to microwave and ultrasonic energy in green chemistry. 5
- (b) Explain the role of water and ionic liquids as solvent for organic reactions. 4
- (c) What are the methods for selection of starting materials in green chemistry? 5

4. (a) Explain the use of catalytic reagents in preference to stoichiometric reagents. 5

- (b) What is a green solvent? Explain supercritical carbon dioxide as a solvent. 5
- (c) Write a note on each of the following: $2 \times 2 = 4$
- Homogeneous catalysis
 - Photocatalysis

UNIT-III

5. (a) What is meant by Bhopal gas tragedy? Explain the conventional and safer route for preparing the compound carbaryl. 6
- (b) Write a note on each of the following: $2 \times 2 = 4$
- Pollution prevention hierarchy
 - Inherent safer design.
- (c) Explain how the production of toxic products and hazardous substances can be prevented in green chemistry. 4
6. (a) Explain the cause of the Flixborough accident. What are the safer routes for the production of cyclohexanol? $3 + 3 = 6$
- (b) Write a note on each of the following: $2 \times 2 = 4$
- Principle of ISD
 - Heterogeneous catalysis
- (c) Explain the development of analytical techniques to prevent and minimise the generation of hazardous substances in chemical process. 4

UNIT-IV

7. (a) What is microwave assisted reactions in organic solvents? Support your answer giving Diels-Alder reaction. 4
- (b) Explain dry cleaning using PERC and give the adverse effect of PERC. 4
- (c) What are polylactic acid? Explain the synthesis of poly lactic acid made from corn. 6
8. (a) Give the green preparation of the following: $2 \times 2 = 4$
- Strecker synthesis
 - Catechol
- (b) What is fouling? Explain the designing of environmentally safe marine antifouling. 6
- (c) What is surfactant? Briefly explain micelle technology. 4

UNIT-V

9. (a) Explain in detail the synthesis of co-crystal controlled solid state (C_2S_3). 6
(b) What is combinatorial green chemistry? Explain. 4
(c) Give an account of proliferation of solventless reactions. 4
10. (a) Explain the importance of green chemistry in sustainable development in modern life. 6
(b) Write a note on each of the following: 3×2=6
(i) Oxidation and catalyst
(ii) Multifunctional reagent
(c) Give brief account of green chemistry and environment. 2
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