

(ii) Explain with reactions of microwave-assisted reactions in water :

Oxidation of toluene and alcohols.  
 $2\frac{1}{2} \times 2 = 5$

(c) (i) What are the *twelve* principles of Green Chemistry ? 4

(ii) Explain *four* principles with suitable examples.  $1\frac{1}{2} \times 4 = 6$

(d) (i) Explain biomimetic synthesis with an example. How it is differ from biocatalysis ?  $3+2=5$

(ii) Write a comparative statement on Green Chemistry and Synthetic Chemistry. 5

(e) (i) What are the roles of Green Chemistry in sustainability ? 5

(ii) Discuss the use of antifoulant in the field of environmentally safe water transportation. 5

(f) (i) Compare the traditional and green synthesis rout of paracetamol. 5

(ii) What are the future prospects of Green Chemistry ? Write briefly on combinational Green Chemistry.  $2+3=5$

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3 (Sem-6/CBCS) CHE HE 1

2025

**CHEMISTRY**

(Honours Elective)

Paper : CHE-HE-6016

(Green Chemistry)

Full Marks : 60

Time : Three hours

**The figures in the margin indicate full marks for the questions.**

1. Answer the following questions as directed :  $1 \times 7 = 7$

(a) An act was setup in 1990 to reduce or eliminate the toxicity of wastes. Name the act.

(b) Risk = Function (Hazard  $\times$  \_\_\_\_\_).  
 (Fill in the blank)

(c) Which greenhouse gas can be used as an excellent green solvent ?

(d) Define atom economy.



(e) What are co-crystals ?

(f) Itai-itai disease is caused due to \_\_\_\_\_ poisoning. (Fill in the blank)

(g) What does EPA stand for ?

2. Answer the following questions :  $2 \times 4 = 8$

(a) What are green solvents ? Explain with examples.

(b) Mention *two* uses of supercritical carbon dioxide.

(c) Give example of an ionic liquid. Why ionic liquid is termed as 'designer solvent' ?

(d) What are organic pigments ?

3. Answer **any three** questions :  $5 \times 3 = 15$

(a) Ultrasound assisted reaction is a step towards a greener environment. Justify giving example.

(b) Plastic waste imposes a great problem in today's world. Discuss the approach of an environmentalist and a green chemist in combating this problem.

(c) What are goals of Green Chemistry ? Mention the obstacles in the pursuit of the goals of green chemistry.  $3 + 2 = 5$

(d) What are feedstocks for green synthesis of ibuprofen ? Write the name and chemical structure of it. Write the chemical reaction involved in green synthesis of it.  $1 + 1 + 1 + 2 = 5$

(e) How phenolic ketones can be prepared by microwave-assisted Fries rearrangement ? What happens when esters are microwave irradiated using KOH-Aliquat ? Write chemical reactions.  $2\frac{1}{2} + 2\frac{1}{2} = 5$

4. Answer **any three** from the following questions :  $10 \times 3 = 30$

(a) (i) Discuss *two* advantages of microwave assisted organic synthesis. Write the reaction of Diels-Alder reaction under microwave irradiation. (ii) 5

(ii) Discuss the role of Tellurium in the debromination of vic-dibromides. What is clayan ?  $4 + 1 = 5$

(b) (i) Give green synthesis of following :  $2\frac{1}{2} \times 2 = 5$

(I) Furfural

(II) Urethane