

4. Write short notes on any three :

- (a) Green chemistry in pharmaceutical industry
- (b) Green Chemistry in Sustainable development
- (c) Green Solvents
- (d) Use of protecting groups (4,4,4)

(1000)

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 3275 H

Unique Paper Code : 32173908

Name of the Paper : SEC : Green Methods in Chemistry

Name of the Course : B.Sc. (Hons) / B.Sc. (Prog)

Semester : IV / VI

Duration : 2 Hours Maximum Marks : 38

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **three** questions in all.
3. Question 1 is compulsory which carries 14 marks.
4. All other questions carry 12 marks each.
5. Attempt all parts of a question together.

P.T.O.

1. (i)(a) Which of the following is a challenge for green chemists?

- (i) Awareness of the benefits of green chemistry
- (ii) Developing chemicals that are recyclable
- (iii) Training for cleaning up chemical spills
- (iv) Knowing when to reduce and eliminate hazardous waste

(b) What is the U.S. Presidential Green Chemistry Challenge Award?

- (i) An award related to recycling
- (ii) An award for industry only
- (iii) The only chemistry award given by the President

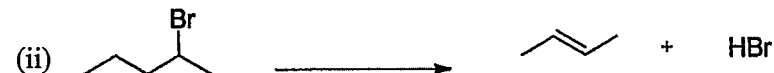
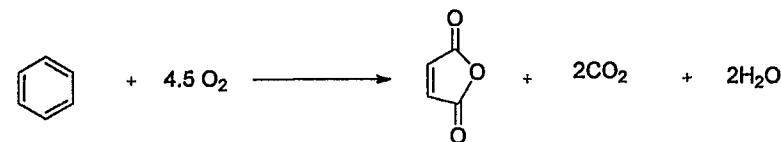
3. (a) (i) What are the goals of green chemistry?

- (ii) How % yield is different from atom economy.
Discuss any one reaction where % yield is 100% but not the atom economy.

(b) Calculate the atom economy of the following reactions :

(Mol mass: C=12, H=1, O=16, Br=80)

(i)



(c) Compare heterogeneous and homogeneous catalysis in terms of green chemistry.

(4,4,4)

P.T.O.

(f) Expand the following :

(i) PERC

(ii) PHB

(iii) PHV (6,8)

2. (a) What do you mean by supercritical carbon dioxide?

Discuss the chemistry of cleaning action of surfactant assisted supercritical CO₂. What are the environmental benefits?

(b) What are the problems associated with inorganic pigments and organic dyes. How these problems can be solved?

(c) How conventional antifoulant are posing environmental threat. How can that be overcome using green methodology? Explain with example. (4,4,4)

(iv) Challenges companies to become fuel efficient

(c) Since 1996, Presidential Green Chemistry Challenge Award winning technologies have helped save or eliminate at least 1.3 billion pounds of hazardous chemicals and solvents

(i) True

(ii) False

(d) Environmental benefits of green chemistry include.

(i) Fewer raw materials and natural resources used

(ii) Cleaner production technologies & reduced emissions

- (iii) Smaller quantities of hazardous waste to be treated and disposed of
- (iv) All of the above
- (e) The first listed of the 12 Principles of Green Chemistry is
- (i) Prevent waste
 - (ii) Catalysis
 - (iii) Atom economy
 - (iv) Benign solvent
- (f) Green chemistry is more expensive than traditional chemistry?
- (i) True
 - (ii) False

- (ii) Answer the following :-
- (a) _____ and moral arguments are often used when discussing sustainability and green chemistry?
- (b) Benzene, a _____ substance, is an important industrial solvent used in the production of pharmaceuticals, plastics, and dyes.
- (c) _____ is an excellent 'green' solvent as well as a greenhouse gas?
- (d) Shortly after mid-night in 1984, a reaction caused poisonous methyl isocyanate gas to leak from a factory in this city, _____ causing 3,700 deaths?
- (e) Green Chemistry reduce risk by _____ .