(b) No solvent is the best solvent in green synthesis of organic compounds. Justify. (10,5)

4. (a) What are Rightfit pigments? Why they are also called azopigments?

(b) How green chemistry is different from environmental chemistry?

(c) How conventional antifoulant are posing environmental threat? How can that be overcome using green methodology? Explain with example. (5,5,5)

5. (a) Why ionic liquids are called "designer solvents"? What are their structural characterstics?

(b) How does the use of protecting/deprotecting group (s) affect the atom economy of the reaction? Explain using appropriate example.

(c) What do you mean by supercritical carbon dioxide? Discuss the chemistry of cleaning action of surfactant assisted supercritical CO_2. What are its environmental benefifs? (5,5,5)

6. Write short notes on **ANY THREE** of the followings :
(a) Green energy
(b) Green Chemistry in sustainable development
(c) Bhopal gas disaster
(d) Renewable feedstock (5×3=15)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4652 **J**

Unique Paper Code : 2174001201

Name of the Paper : GE: GREEN CHEMISTRY

Name of the Course : **All Undergraduate Courses Except with Chemistry Discipline**

Semester : II

Duration : 2 Hours Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **FOUR** questions out of **six**.
3. Use of simple calculator is permitted.

1. (a) Fill in the following blanks :

(i) Microwave heating involves the conversion of _____ energy into _____ energy.

(ii) _____ is an excellent 'green solvent' as well as a greenhouse gas.

(iii) The mass ratio of the waste to product is known as _____.

(iv) Catalytic reagents are _____ to stoichiometric reagents.

(v) An insecticide factory in _____ city emitted toxic methyl isocyanate gas shortly after midnight in 1984 resulting in 3,700 deaths.

(b) Mark True/False for the given statements :

(i) Biocatalytic reactions are very selective to reactants.

(ii) Bio-plastic is obtained from non-renewable resources.

(iii) A chemical process with an E-Factor of 1 creates less waste than an E-Factor of 25.

(iv) Green chemistry can provide green technology solutions for a sustainable future.

(v) Paul Anastas & John Warner created 10 principles of Green Chemistry to reduce or eliminate the use and generation of hazardous substances.

(c) Match the List-I with List-II :

List-I	List-II
1. Water	A. Dry cleaning of clothes
2. Benzene	B. Ionic Liquid
3. Enzymes	C. Carcinogenic
4. [emim]$AlCl_4$	D. Universal solvent
5. PERC	E. Biocatalysts

(5,5,5)

2. (a) How would you relate the use of catalyst with green chemistry? Explain with suitable example.

(b) Explain the green chemistry principle number 4 with appropriate example.

(c) Explain the concept of "Inherently safer chemistry for accident prevention". (5,5,5)

3. (a) Bromoethane may be synthesized by following two routes:

Route-1:

$$C_2H_4 + HBr \longrightarrow C_2H_5Br$$

Route-2:

$$C_2H_6 + Br_2 \longrightarrow C_2H_5Br + HBr$$

Define atom economy. Calculate % atom economy and comment on the greenness of both the routes (1 & 2). (Atomic Mass (amu): C=12; H=1; O=16; Br=79.9)