4. (a) Explain briefly each level of Waste Prevention Hierarchy. 5

(b) What are antifoulants ? Give the structure of one environmentally safer antifoulant and discuss its advantages. 5

(c) Mention the importance of green chemistry in daily life with the help of examples. 5

5. (a) Explain the green chemistry principle no. 8. Mention the drawbacks of using protecting groups in organic synthesis. 5

(b) Why is $scCO_2$ superior to VOCs as a solvent ? Describe. 5

(c) Describe the effective green synthesis of corn – based plastic. Write the green - principle that it incorporates. 5

6. Write short notes on any **three** of the following :

(a) Flixborough disaster

(b) Surfactants for carbon dioxide

(c) Green energy and sustainability

(d) Ionic Liquids 5×3=15

***

[This question paper contains 4 printed pages]

Your Roll No. : .....

Sl. No. of Q. Paper : **5311 I**

Unique Paper Code : 2174001201

Name of the Paper : GE : Green Chemistry

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

Semester : II

Time : 2 Hours ***Maximum Marks : 60***

Instructions for Candidates :

(a) Write your Roll No. on the top immediately on receipt of this question paper.

(b) Attempt any **four** questions out of **six**.

(c) Use of simple calculator is permitted.

1. (a) Fill in the following blanks : 5

(i) Risk = [function {Hazard × .....}]

(ii) SEA – NINE is a green ..... agent.

(iii) ..... are also known as designer solvents.

(iv) ..... are known as the father of Green Chemistry.

P.T.O.

(v) Benzene, a ..... chemical, is an important industrial solvent used in the production of pharmaceuticals, plastics and dyes.

(b) Expand the following terms (any **five**) : 5

(i) VOC

(ii) EPA

(iii) PERC

(iv) ISD

(v) PEG

(iv) sc – CO_2

(c) Mark **True/False** for the given statements : 5

(i) 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.

(ii) Green Chemistry is more expensive than Traditional Chemistry.

(iii) Use of Non – Renewable feedstocks is one of the principles of Green Chemistry.

(iv) Green Chemistry is also known as Environmental Chemistry.

(v) Atom economy of rearrangement reaction is greater than addition reaction.

2. (a) What are catalysts ? What are the advantages of catalytical reagent over conventional reagents ? 5

(b) Define the following terms with one example of each : 2.5×4=10

(i) Biodegradation

(ii) Biocatalysts

(iii) Biofuel

(iv) Rightfit pigment

3. (a) What do you mean by atom economy ? How it is different from % yield ? Calculate the % atom economy for the conversion of 2 – methylpropan-2–ol into 2–chloro-2-methylpropane in the following reaction : 10

$(CH_3)_3C - OH + HCl \rightarrow (CH_3)_3C - Cl + H_2O$

(Atomic Mass (amu) : C = 12; H=1; O=16; Cl = 35.5)

(b) What are the problems associated with inorganic pigments and organic dyes ? How these problems can be solved ? 5