

- (c) What are green solvents? Also discuss the advantages and disadvantages of water as solvent in organic reactions. (6,4,5)

5. Write the short notes on the following :

- (a) Surfactants in ScCO_2 solvent.
(b) Green Energy and Sustainability
(c) VOC and its environmental impact
(d) Pollution Prevention Hierarchy (4,4,4,3)

6. (a) What is biocatalysis? Give two relevant advantages and two limitations of biocatalysts used in the chemical reaction.

- (b) Suggest one green solvent that can replace perchloroethylene (PERC) in the dry cleaning of garments. Give any two drawbacks of PERC that provides a rationale for its replacement. Also give two greener relevance of the solvent.

(c) What are antifoulants? Why the marine antifoulant tributyl tin oxide (TBTO) has been replaced by Sea Nine 211? Which green chemistry principle is being followed in this case? (5,5,5)

(1000)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 5839

H

Unique Paper Code : 2174001201

Name of the Paper : All Undergraduate Courses
except with Chemistry
Discipline

Name of the Course : **GE : Green Chemistry**

Semester : II / IV

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 any **FOUR** questions.
3. **All** questions carry equal marks.
4. Atomic Weight : C=12; O=16; H=1, Br=35, P=15

P.T.O.

1. (a) Write the toxic effect of the lead salts. Give the reasons for its toxicity?
- (b) "Green chemistry is sustainable chemistry." Explain the statement?
- (c) Define rightfit pigment. Why are they also called azo pigments?
- (d) Define Atom economy.
- (e) Give one example of the following : (Attempt any SEVEN)
 - (i) Green solvent
 - (ii) Auxiliary substance
 - (iii) Catalytic reagent
 - (iv) Solvent free reaction
 - (v) Rightfit pigment
 - (vi) Phase transfer catalyst
 - (vii) Green Bleaching Agent
 - (viii) Biocatalyst (2,2,2,2,7)
2. (a) Give the twelve principles (name only) of the green chemistry.

- (b) Briefly explain any two with a suitable Example.
 - (i) Design for Energy Efficiency
 - (ii) Greenness of a Reaction
 - (iii) Inherent safe design
- (c) Which gas was responsible for the Bhopal Gas Tragedy? Give the conventional and green method for the synthesis of carbaryl? (6,4,5)
3. (a) What is bioplastic made up of? What are advantages and disadvantages of bioplastics?
- (b) What is the role of solvent in a chemical reaction? What is solvent free synthesis and how does it work without solvent?
- (c) Calculate the atom economy and E-factor for the following reaction. (6,4,5)
4. (a) What is super-critical carbon dioxide? What are the advantages over conventional organic solvents?
- (b) Define "Ionic liquids" and give the structure of any two ionic liquids.