

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 9212

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 any **FOUR** questions out of **six**.
3. Use of calculator is permitted.

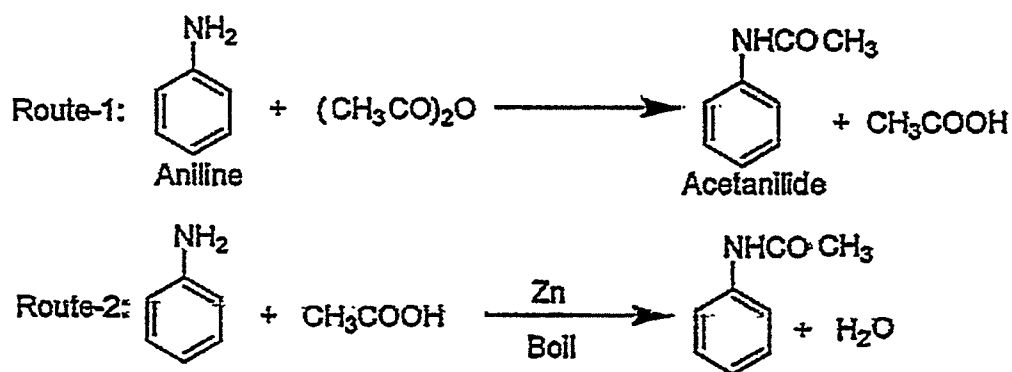
1. (a) Fill in the blanks (**any ten**) :

- (i) Sonochemistry is the process of organic synthesis under _____ irradiation.
- (ii) _____ is good alternative for dry cleaning of clothes.
- (iii) Transesterification process is used to produce the _____ fuel.
- (iv) _____ is fulfilling the needs of present generation without compromising the-ability of future generations to meet their needs.
- (v) _____ the compound extracted from orange peel using dry ice.
- (vi) A chemical which causes the depletion of the ozone layer is _____ .

P.T.O.

- (vii) Asymmetric synthesis utilizes _____ catalyst.
- (viii) "Real time pollution prevention" is covered under green chemistry principle number _____.
- (ix) The concept of atom economy is introduced by _____.
- (x) _____ and _____ are examples of green solvents.
- (xi) "Green Chemistry: Theory and Practices" book written by _____ and _____ in 1998.
- (b) Give reasons for the following (**any two**) :
- (i) Addition reactions are 100 % atom economical.
 - (ii) Solvents and chemicals used in green chemistry are safer and, economical.
 - (iii) Green chemistry is a sustainable chemistry. (10,2.5,2.5)
2. (a) What is Presidential green chemistry challenge award? Explain about **any two** award winning synthesis/processes.
- (b) Define the following terms :
- (i) Renewable feedstock
 - (ii) Real time analysis
- (c) Explain the principle of inherent safer design (ISD). (5,5,5)
3. (a) Enumerates properties and uses of biocatalyst. Give two examples of biocatalysis.

- (b) Differentiate between homogeneous and heterogeneous catalysts?
- (c) What are the green energy sources? Compare the microwave heating with conventional heating in organic synthesis. (5,5,5)
4. (a) What is meant by the term atom economy? What is the significance of atom economy? The following two routes can be used to prepare acetanilide; determine the % atom economy for each route and comment on greenness of the two routes.



(Atomic mass (amu): H=1, C=12, N=14, O=16)

- (b) List the twelve principles of green chemistry? Describe principle no. 4 and 8 with appropriate example. (10,5)
5. (a) Give sketches of the following :
- Atom economy diagram
 - Phase diagram for ScCO_2
- (b) Explain 'Prevention, of waste' principle in green chemistry

9212

4

- (c) What do you understand by solid phase synthesis? Elaborate the advantages of solid phase synthesis. (5, 5, 5)

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

- (a) Polylactic acid
- (b) Antifouling agent
- (c) Biodegradability in green chemistry
- (d) Flixborough accident (5,5,5)