

[This question paper contains 4 printed pages.]

5167

Your Roll No.

B.Sc. Prog./III

B

EL 310 (i) – GREEN CHEMISTRY

(Admissions of 2005 & onwards)

Time : 2 Hours

Maximum Marks : 38

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

Attempt any five (05) questions in all.

Question No. 1 is compulsory.

1. (a) Fill in the blanks with appropriate words :

- (i) Dimethylcarbonate (DMC), is an environment friendly substitute for _____ and _____ in methylation reactions.
- (ii) Catalytic reagents are _____ to stoichiometric reagents.
- (iii) Claisen rearrangement and Fries rearrangement are the examples of _____ reactions.
- (iv) Risk = {function[Hazard X _____]}
- (v) Barry Trost is associated with the concept of _____

P.T.O.

- (vi) Microwave heating involves the conversion of _____ energy into _____ energy.
- (vii) A raw material or feedstock should be _____ rather than _____ whenever technically and economically practicable.
- (viii) LD_{50} is the dose of a _____ at which _____ of a group of animals (usually rats or mice) are killed. (1×8=8)

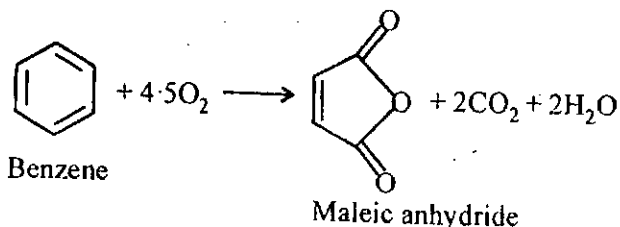
(b) Define any three of the following terms :

- (i) CLAYAN
- (ii) BIOCATALYSIS
- (iii) ATOM ECONOMY.
- (iv) SUSTAINABILITY
- (v) GREEN CHEMISTRY (2×3=6)

2. Maleic anhydride may be synthesized by the following two routes :

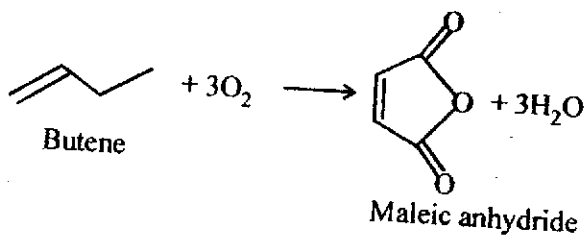
Route I

(a) By Benzene Oxidation



Route II

(b) By Butene Oxidation



What is the % atom economy of both the reactions.
 What advantages would there be if Route(II) were offered as a green chemistry alternative for the production of Maleic anhydride? (6)

3. Write down the twelve basic principles of Green Chemistry. Explain any two principles of Green Chemistry with the help of examples. (6)
4. (a) Elaborate the statement – “Microwave heating as a Greener Technology”.
 (b) Write a reaction for the “Saponification of Esters” under microwave irradiation.
 (c) What type of reaction vessels are used in microwave reactions? (2×3=6)
5. Provide Green Route of Synthesizing the following compounds (any **three**):
 - (i) Catechol
 - (ii) Methyl methacrylate

(iii) Citral

(iv) Ibuprofen

(v) Furfural

(vi) Paracetamol

(2×3=6)

6. (a) Give different techniques of minimizing Hazardous Wastes.

(b) What is Supercritical CO₂? What are its advantages? (4,2)

7. (a) Define 'Ionic Liquids' [ILs].

(b) What are the characteristics of Ionic Liquids?

(c) Discuss the advantageous points with water as solvent in comparison to organic solvents. (2×3=6)

8. (a) What is sonication? Which effect is responsible for supplying energy in sonication?

(b) Give an example of any two of the following ultrasound assisted reactions:

(i) Reformatsky reaction

(ii) Cannizzaro's reaction

(iii) Strecker Synthesis

(iv) Coupling reaction

(2,4)