

Sr. No of the question paper : 103

Name of the Course : B.Sc. (H) Chemistry

Semester : VI

Name of the paper : DSE-8: Green Chemistry

Unique Paper Code : 32177908

Duration: 3 hrs

Maximum Marks: 75

Instruction for the candidates

1. Write your Roll no. on the top immediately on the receipt of the question paper.
2. Attempt ~~Six~~ questions. All parts of a question should be attempted together.
3. Each question carries 12.5 marks.

1. (a) Fill in the blanks:

- i) $\text{Risk} = f(\text{Hazard} \times \dots\dots\dots)$
- ii) Atom economy of rearrangement reactions is always %
- iii) E-factor =
- iv) is the Father of green chemistry.
- v) is referred as the green and universal solvent.
- vi) An ultrasonic transducer converts electrical energy into energy.
- vii) is extracted from orange peel using supercritical CO_2 .

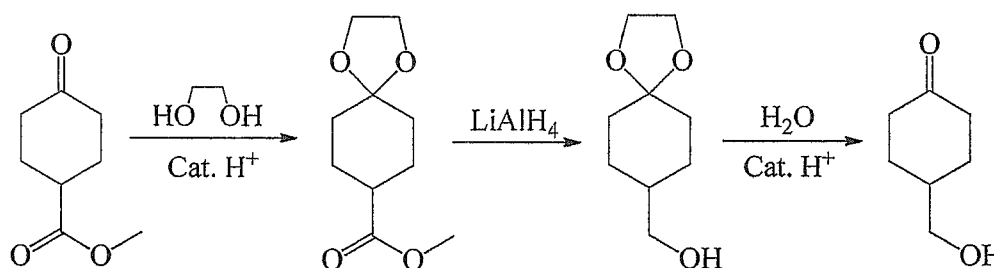
(b) Write one word answers to the following questions:

- i) A substance at a temperature and pressure above its critical point, where distinct liquid and gas phases do not exist.

- ii) Chemistry involving application of sound energy to agitate particles in a chemical reaction.
 - iii) Process of employing catalyst that is utilized for speeding up chemical reactions that requires or engages light.
 - iv) Chemistry involving in the design of chemical products and processes that reduce or eliminate generation of hazardous substances.
- (c) Why EcoWox carpeting produced by Shaw industries is preferred over PVC backed carpeting. Explain:

(4.5, 4, 4)

2. (a) Why catalysis is important to green chemistry? Differentiate between homogeneous and heterogeneous catalysis?
- (b) Why the following conversion is not considered as green? Name the principles of green chemistry which are not followed here:



- (c) Justify, why sonochemical Simmons-Smith reaction is a better alternative to conventional method.

(4.5, 4, 4)

3. (a) What are supercritical fluids? Why supercritical CO₂ is preferred over many other supercritical fluids? Explain using labeled diagram.
- (b) What are the goals of green chemistry? Why it is difficult to achieve these goals?
- (c) What are biocatalysts? Mention their merits and demerits.

(4.5, 4, 4)

4. (a) Explain the efficient green synthesis of plastic made from corn and provide the green chemistry principles involved.
- (b) Why catalytic reagents are preferred over stoichiometric reagents? Explain with suitable examples.
- (c) Discuss green chemistry methodology to synthesize catechol by highlighting the limitations associated with conventional route.

(4.5, 4, 4)

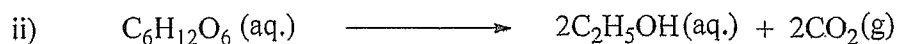
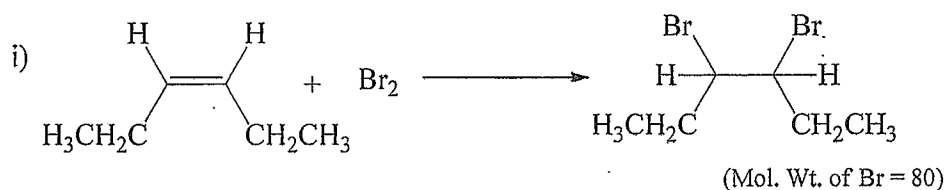
5. (a) What is waste or pollution prevention hierarchy? Discuss using suitable diagram.
- (b) "What you don't have cannot harm you?" Justify the statement.
- (c) Name the gas responsible for "Bhopal gas tragedy". Provide the green route for the synthesis of carbaryl.

(4.5, 4, 4)

6. (a) Name the principle involved in microwave assisted reactions. Discuss Diels-Alder reaction under microwave conditions. What are the advantages of microwave assisted synthesis?
- (b) Provide the green and conventional synthesis of disodium iminodiacetate.
- (c) What is biodiesel and how it is prepared? What is the composition of B20.

(4.5, 4, 4)

7. (a) Define atom economy. Calculate percentage atom economy of the following reactions:



(b) Discuss briefly the problems associated with conventional synthesis of adipic acid and give the alternate green synthesis of it.

(c) What are ionic liquids and why they are also termed as designer solvents? Give two examples.

(4.5, 4, 4)

8. (a) What is interesterification of oils? Differentiate between chemical and enzymatic interesterification.

(b) Write short notes on (*Any two*):

(i) Combinatorial synthesis

(ii) Environmentally advanced wood preservatives

(iii) Flixborough tragedy

(c) What is ozone layer? Name the chemicals which are responsible for its depletion and explain the various reactions involved.

(4.5, 4, 4)