

Sr of the question paper:

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

Semester: V

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 *four* questions. All parts of a question should be attempted together
3. Each question carries 18.75 marks

Ques 1(a) What is the role of solvent in a chemical reaction? How is the role fulfilled in solvent free reaction. What are the advantages of solvent free synthesis. Explain with suitable reactions.

(b) Which gas was responsible for the Bhopal Gas Tragedy? Give the conventional and green method for the synthesis of carbaryl.

(c) Give the green of synthesis of the following (*any two*)

- (i) Adipic acid
- (ii) Catechol
- (iii) Disodium diiminodiacetate

(d) Plastic waste imposes a great problem in today's world. Discuss the approach of an environmentalist and a green chemist in combating this problem.

(5.75, 5, 5, 3)

Ques 2 (a) What is 'Carbon Neutral Balance'? How human activities are disturbing this balance? Why the use of bio-solvents/ biofuels helps in the maintenance of this balance?

(b) Justify the following statements

- (i) Economic sustainability through green chemistry
- (ii) Environmental sustainability through green chemistry

(c) Ultrasound assisted reaction is a step towards a greener environment. Justify giving example.

(d) An act was set up in 1990 to reduce or eliminate the toxicity of wastes. Name and elaborate it.

(5.75, 5, 3, 5)

Ques 3 (a) Discuss two advantages of microwave assisted organic synthesis. Write the reaction of saponification of ester and Diels Alder reaction under microwave irradiation.

(b) What are photocatalysts? How photocatalytic reactions are different from photochemical reactions?

(c) What is the green alternative of PERC in dry cleaning of clothes? List the disadvantages of PERC and the advantages of the greener substitute.

(d) What are antifoulants? What were the adverse effects of the conventional antifoulant?

(5.75, 5, 5, 3)

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

(b) Catalytic reagents are superior to stoichiometric reagents. Explain.

(c) What are Rightfit pigments? List the toxicological problems associated with the conventional colourants.

(d) Discuss the advantages of combinatorial approach over conventional synthesis.

(5.75, 5, 5, 3)

Ques 5 (a) _____ is most versatile, biodegradable thermoplastic polyester. How is it synthesized in a greener way?

(b) What are fluoros biphasic solvents? Discuss the limitations and one valuable applications of the solvent system.

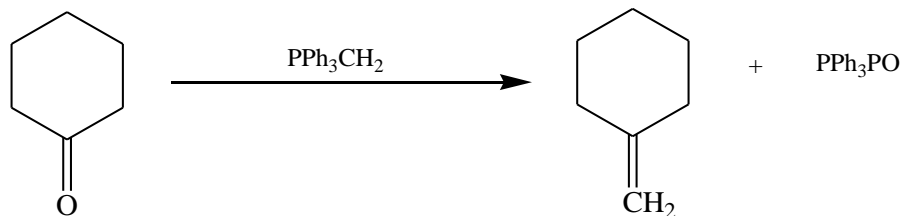
(c) (i) What are the barriers to the implementation of green chemistry?

(ii) Green chemistry and sustainable development are inter-related. Explain?

(d) Explain the term depleting feedstock. Give example.

(5.75, 5, 2x2.5, 3)

Ques 6 (a) What do you mean by atom economy? Calculate % atom economy for the formation of the main product in the following reaction:



Atomic Mass: C=12; H=1; O=16; P=31

(b) Differentiate Homogenous and Heterogenous Catalysis. Bio catalysis is homogenous or Heterogenous?

(c) Write short notes on (*Any two*)

- i. Flixiborough accident
- ii. Fully recyclable carpet: Cradle to cradle carpeting
- iii. Cocrystal controlled solid state synthesis

(5.75, 5, 2x4)