(iii) Why polymers/plastics are a matter of concern for the environment. How can one design biodegradable polymers. (4)

(iv) Write Diels Alder reaction. What are the advantages of carrying Diels Alder reaction in ionic liquids. (3)

09.01.24(M)

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1668 **G**

Unique Paper Code : 2173012003

Name of the Paper : DSE – Green Chemistry in Organic Synthesis

Name of the Course : **B.Sc. (Hons.) Chemistry**

Semester : III

Duration : 3 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **6** questions.

1. (i) Fill in the blanks with appropriate words : (4)

(a) A chemical process with an E factor of 12 creates _____ waste than that with an E factor of 102.

(b) _____ and _____ outlined the 12 principles of green chemistry in 1998.

(c) _____ is the winner of the Presidential green chemistry challenge: 2002 greener synthesis pathways.

(d) The amount of product per mole of catalyst is known as _____.

(ii) What are biomass derived solvents? Give synthesis of any one biomass derived solvent. (4)

(iii) Write the enzyme catalyzed green synthesis of adipic acid. (4)

(iv) What is waste or pollution prevention hierarchy, explain diagrammatically. (3)

2. (i) Discuss the terms risk, hazard and exposure and their relationship with each other in terms of green chemistry. (4)

(ii) Give the green synthesis of disodium iminodiacetate (DSIDA). What are its advantages over conventional synthesis. (4)

(iv) What is the principle of ISD? State the subdivisions of ISD. (3)

7. (i) Define Green Chemistry. State the role of green chemistry in sustainable development. (4)

(ii) What are zeolites. Give the Asahi process for synthesis of cyclohexanol. (4)

(iii) What are the advantages of synthesis of 6-aminopenicillanic acid (6-APA) from penicillin G over the conventional synthesis. (4)

(iv) State the pollution prevention act of 1990. (3)

8. (i) Differentiate between heterogeneous and homogeneous catalysis. (4)

(ii) Explain microwave assisted solvent free reaction taking suitable example. (4)

(iv) Give any one example of cis trans isomerization of alkene in the presence of light. (3)

6. (i) Correct the following statements: (4)

(a) Haber Bosch process for synthesis of ammonia is a homogeneous catalytic reaction

(b) TiO_2 is a homogeneous photo catalyst.

(c) Zeolites consist of Si, Al, Zn.

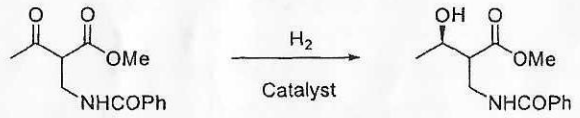
(d) 2001 Nobel prize in chemistry was awarded to Ryoji Noyori for asymmetric oxidation of ketones.

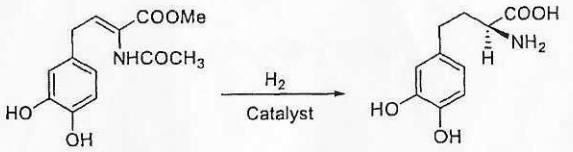
(ii) Give the green synthesis of 4-amino-2-hydroxybenzoic acid (Paramycin), from aromatic sulfonic acids containing waste water. (4)

(iii) What do you understand by in-water and on-water reactions? What are the advantages of carrying a reaction in water as a solvent. (4)

(iii) State some goals of the green chemistry goals and highlight the limitations in pursuing such goals. (4)

(iv) Mention the catalyst used in the following reactions : (3)

(a) 

(b) 

(c) Phthalic anhydride + Urea $\xrightarrow[\text{Catalyst}]{\text{CuCl}}$ Cu (II) phthalocyanine complex Catalyst.

3. (i) Give two examples of reactions with 100% atom economy. (4)

(ii) What is supercritical carbon dioxide? What are the advantages of using it over other reaction media? (4)

P.T.O.

(iii) What are ionic liquids? Why are they considered as tailored solvents? (4)

(iv) Write the product formed in the following reactions : (3)

(a) $CH_2=CH_2 + CO + H_2O \longrightarrow$

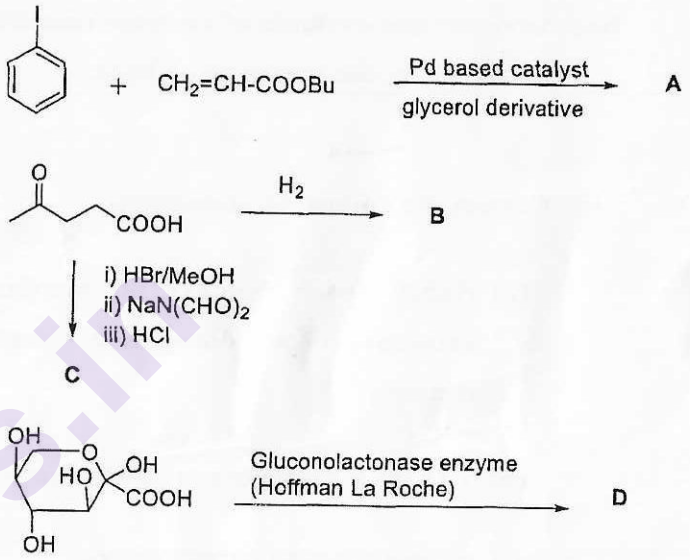
(b) $CH_2=\underset{\displaystyle CH_3}{\underset{|}{C}}-COOH + CH_3OH \longrightarrow$

(c) $CH_2=CH_2-CN + 2\,H_2O + 2\,e^- \longrightarrow$

4. (i) Write Simmons Smith reaction and mention the advantage of conducting this in the presence of ultrasound. (4)

(ii) What are the various stages for the general catalytic cycle for heterogeneous catalysis. (4)

(iii) Identify A, B, C and D in the following reactions : (4)



(iv) Give the light induced (photochemical) synthesis of caprolactam. (3)

5. (i) What are rightfit pigments? Give their applications. (4)

(ii) How is no trans fat or oil synthesized using the interesterification method? Explain with a chemical reaction. (4)

(iii) What was the cause of the Bhopal gas tragedy? Discuss with suitable chemical reactions how it could have been avoided. (4)

P.T.O.