

541/Chem.

UG/5th Sem/CHEM-H-DSE-T-2C/24

U.G. 5th Semester Examination - 2024

CHEMISTRY

[HONOURS]

Discipline Specific Elective (DSE)

Course Code : CHEM-H-DSE-T-2C

Full Marks : 40

Time : 2½ Hours

The figures in the right-hand margin indicate marks.

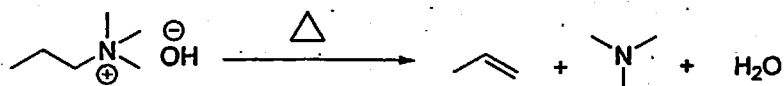
Candidates are required to give their answers in their own words as far as practicable.

1. Answer any five questions: 2×5=10
- a) Write the relation between mass intensity (MI) and E- factor.
 - b) 'Addition reactions are 100% atom economical reactions'—justify the statement.
 - c) Write a short note on CCS.
 - d) What are the utilities of sonochemical reaction over conventional heating process?
 - e) Name different types of cavitation and specify which type is mainly responsible for chemical reaction.
 - f) No solvent is the best solvent in green synthesis of organic compounds—explain.
 - g) Explain 'cohesive energy' density'.
 - h) What is meant by ionocity of an ionic liquid?

[Turn over]

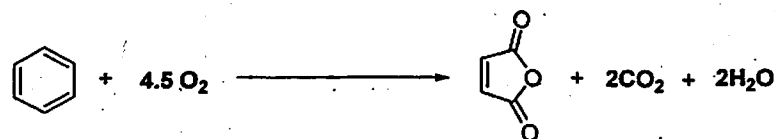
2. Answer any two questions: $5 \times 2 = 10$

- a) i) Is the following reaction a green synthesis? Give reason of your answer. 2

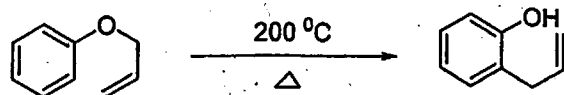


- ii) What do you mean by Inherent Safer Design (ISD)? Write the safer route to industrial production of carbaryl (Sevin). 1+2

- b) i) Calculate and contrast the % atom economy of the following reaction: 3



and

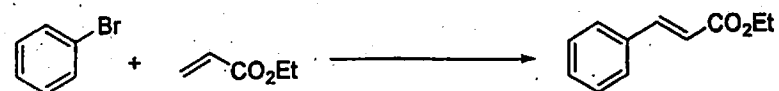


- ii) Why is % atom economy a better parameter than % atom utilization for measuring greenness of a reaction? 2
- c) i) What is ionic liquid? Why it is called designer solvent? 1+1
- ii) What characteristics of water make it benign solvent? 2

- iii) Give one example of room temperature ionic liquid. 1

- d) i) Mention the reaction condition for the oxidation of toluene under microwave irradiation. 2

- ii) Write suitable green reagents and reaction conditions for the following conversion: 2



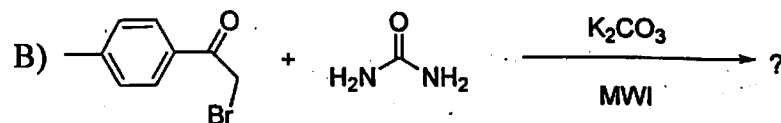
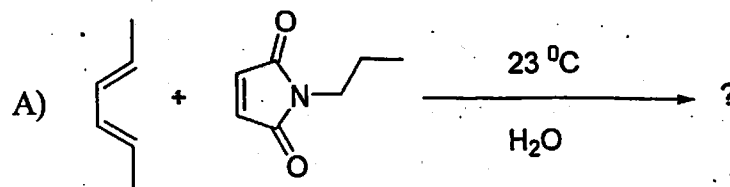
- iii) What is critical point of CO_2 ? 1

3. Answer any two questions: $10 \times 2 = 20$

- a) i) What are susceptors in MWI process? Give example. 2+1

- ii) Mention the advantages of using ultrasonic in the medical field over other techniques. 2

- iii) Predict the product with mechanism of the following reactions: $2 \frac{1}{2} \times 2$



- b) i) Discuss about life time of a chemical product and use of safer substances following the principles of green chemistry. 3
- ii) Why oxidation of cyclohexane to adipic acid is not considered as green synthesis? Write down one green approach for the synthesis of adipic acid. 2+3
- iii) Discuss the use of supercritical water in organic synthesis and organic waste management. 2
- c) i) Ultrasonic waves are not audible to humans' — Why? 2
- ii) Give two examples of ultrasound assisted reactions. 2+2
- iii) What are the differences between pigments and dyes? 2
- iv) Write the name and structure of one surfactant which can form micelle in scCO_2 . 2
- d) i) Write down the synthetic method of polylactic acid(PLA) from corn. 3
- ii) What is IDA? How can you correlate IDA with EDTA? 2+2
- iii) What are marine antifoulants? Give one example of most commonly used marine antifoulant and give its structure. 1+2
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