



WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 6th Semester Examination, 2024

CEMADSE04T-CHEMISTRY (DSE3/4)

GREEN CHEMISTRY

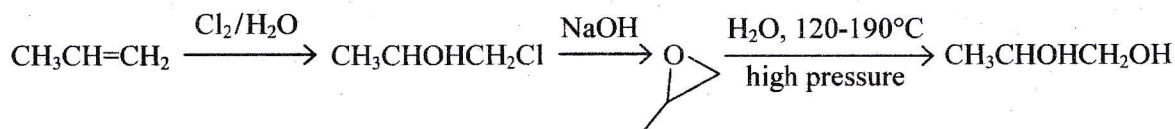
Time Allotted: 2 Hours

Full Marks: 40

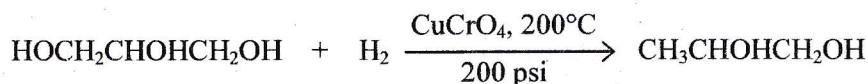
*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.**All symbols are of usual significance.***Answer any three questions taking one from each Group****GROUP-A**

1. (a) Write the relation between mass intensity (MI) and E-factor. What is the value of E-factor for an ideal process? 2+1
- (b) Define the term 'atom economy'. 'Addition reactions are 100% atom economical reactions.' — Justify the statement. 2+2
- (c) Why microwave is a non-ionizing radiation? Give an example of ionizing radiation. What are the differences between microwave heating and conventional heating? 1+1+2
- (d) What is sonoluminescence? Why are monoatomic gases more prone towards sonoluminescence? 2+1
- (e) What is cavitation? Name different types of cavitation and specify which type is mainly responsible for chemical reaction. 1+3
- (f) What are susceptors in MW-induced reactions? Mention two differences between susceptors and catalysts. 2+2
2. (a) Discuss life time of a chemical product and use of safer substances following the principles of green chemistry. 3
- (b) Which of the following reactions has higher atom economy? Explain your answer. 5

Reaction 1:



Reaction 2:



- (c) What do you mean by ISD? Mention the use and green synthesis of carbaryl. 1+1+2

- (d) Give one example of photocatalyst. 1
- (e) What are the factors involved in measuring toxic effect of chemical substance? Explain with examples. 3
- (f) What is ionic liquid (IL)? Give an example. What is the role of fluorous biphasic solvent in green synthesis? 2+1+3

GROUP-B

3. (a) Why oxidation of cyclohexane or cyclohexanol to adipic acid is not considered as green synthesis? Write down one green approach for the synthesis of adipic acid. 2+3
- (b) What are the differences between pigments and dyes? 3
- (c) Why organic dyes are light sensitive? 2
4. (a) What are enzymatic inter-esterification reactions? Describe how enzymatic inter-esterification helps for production of no trans-fats and oils. 2+2
- (b) Briefly discuss the role of $scCO_2$ in cleaning industry. Write the name and structure of one surfactant which can form micelle in $scCO_2$. 3+2
- (c) Give an example of safe marine anti-foulant. 1

GROUP-C

5. (a) Biocatalysts are different from traditional catalysts. — Explain. Give two examples of reactions where biocatalysts are used. 2+4
- (b) What is multifunctional reagent? Give an example. 2
6. (a) What are co-crystals? Briefly explain any two methods of solid state co-crystallisation. 1+4
- (b) What are DRAM and RRAM? 2
- (c) Give one example of green oxidant. 1

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