UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 4th Semester Examination, 2021

SEC1 (P2)-CHEMISTRY

GREEN CHEMISTRY

Full Marks: 40

ASSIGNMENT

The figures in the margin indicate full marks.
All symbols are of usual significance.

Answer any *four* questions from the following   10×4 = 40

1. (a) "Green Chemistry is sustainable chemistry" – Explain the statement.   5

    (b) What are Green solvents? Explain with examples.   5

2. (a) What do you mean by Renewable feed stocks? How does the use of a catalyst help in Green synthetic methodologies?   2+3

    (b) What is Supercritical CO_2? What are its advantages?   1+2

    (c) In comparison to organic solvents what are the advantages of using water as a solvent?   2

3. (a) Elaborate the statement "Microwave heating as a Greener Technology".   3

    (b) What type of reaction vessels are used in microwave assisted synthesis?   2

    (c) Write the reaction for the "saponification of ester" under microwave irradiation.   2

    (d) Discuss about the industrial applications of supercritical CO_2 as a solvent.   3

4. (a) What are Fluorous biphasic solvents? Discuss the limitations and one valuable application of this type of solvent system.   2+2

    (b) Define 'atom economy'. How can you improve the atom economy of a reaction?   2+2

    (c) What do you mean by E-Factor in Green chemistry?   2

5. (a) What do you mean by 'design of synthesis for energy efficiency and design for degradation'?   3

    (b) What are Ionic Liquids?   2

    (c) Write down the characteristics of Ionic liquids.   3

    (d) What are the advantages of using Ionic liquids as solvents?   2

6. Provide a green synthetic route for the synthesis of the following compounds. $2\frac{1}{2} \times 4 = 10$

    (i) Citral   (ii) Furfural   (iii) Methyl methacrylate   (iv) Paracetamol

7. Give one example of each of the following: $2 \times 5 = 10$

    (a) Microwave assisted reaction in water

    (b) Microwave assisted reaction under solvent-free condition

    (c) Green synthesis using water as a solvent

    (d) Green synthesis in solid phase

    (e) Ultrasound assisted coupling reaction.

8. Write short notes on: $2\frac{1}{2} \times 4 = 10$

    (a) Combinatorial Green Chemistry

    (b) Green Chemistry in sustainable development

    (c) Goal and limitations of Green Chemistry

    (d) Green Chemistry in Industry.

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