'समानो मन्त्रः समितिः समानी'

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 4th Semester Examination, 2023

SEC1-P2-CHEMISTRY

GREEN METHODS IN CHEMISTRY

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.

GROUP-A

1. Answer any ***five*** questions from the following: 1×5 = 5

   (a) What is SCF?

   (b) Give an example of RTIL.

   (c) What does 'VOC' and 'PERC' stand for?

   (d) Name a chemical method by which bio-diesel is obtained from oil.

   (e) What is E-factor?

   (f) Name two green solvents commonly used in the laboratory.

   (g) Give an example of a surfactant used with CO_2 as a solvent.

   (h) What is LC_{50}?

GROUP-B

2. Answer any ***three*** questions from the following: 5×3 = 15

   (a) (i) What is sonochemistry? Explain its principle. (1+2)+2

   (ii) Which reactions are most compatible in fluorous solvents?

   (b) (i) What advantages do the supercritical fluids have over conventional solvents? 4+1

   (ii) Name two widely used supercritical fluids.

   (c) What is meant by marine antifoulant? Name a new age antifoulant. What is its advantage over TBTO? 2+1+2

   (d) (i) Calculate the % atom economy for the following reactions. (2×2=4)+1

$$3CH \equiv CH \xrightarrow[\Delta]{Cu} C_6H_6$$

$$CH_3COOH + C_2H_5OH \xrightarrow[warm]{H_2SO_4} CH_3COOC_2H_5 + H_2O$$

   (ii) Give an example of a heterogeneous catalyst.

(e) (i) Why are Ionic liquids called 'designer solvents'? What are the advantages of using ionic liquids in chemical synthesis? (1+2)+2

(ii) What are rightfit pigments? Give one example.

GROUP-C

3. Answer any ***two*** questions from the following: 10×2 = 20

(a) (i) What are compostable plastics? Give one example. How is compostable plastic different from biodegradable petroleum based plastic? 2+1+3

(ii) Why are enzymes known as biocatalysts? What are its advantages in the context of green chemistry? 2+2

(b) (i) Suggest a green synthesis of ibuprofen. Mention its advantage over traditional synthesis. 3+2

(ii) Give the disadvantages of using water as a solvent in organic synthesis. 2

(iii) What role does the anionic counterpart of the ionic liquid have in influencing its property? 3

(c) (i) What are photochemical reactions? Why are they considered to be "green"? 2+2

(ii) What is atom economy? Who introduced the term? Give an example of a reaction demonstrating 100% atom utilization. 2+2

(iii) Give an example of an asymmetric catalysis and a phase transfer catalysis. 2

(d) (i) Write down a flowchart for the formation of PLA from starch. 3

(ii) Mention uses of PLA. 2

(iii) What are the advantages and disadvantages of PLA? $2\frac{1}{2}+2\frac{1}{2}$

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