

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: IMSc
BRANCH: CHEMISTRY

SEMESTER : II
SESSION : SP/2023

SUBJECT: CH115 GREEN METHODS IN CHEMISTRY
TIME: 3 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) Define atom economy and yield of a reaction. Give one example of a reaction with 100% atom economy. [3+2]
- Q.1(b) What is Principle 09 of Green Chemistry? Give one example of reaction using of DIBAL-H. Is DIBAL-H a good reagent and satisfies the principle 09 of Green Chemistry? Explain [1+1+3]
- Q.2(a) Outline with suitable examples the Atom Economy of all types of chemical reactions. [5]
- Q.2(b) Compare and contrast the following: Atom economy, *E*-factor and mass intensity. What are chemoselective reagents? Illustrate with examples. [3+2]
- Q.3(a) What is the critical temperature (T_c) and critical pressure (P_c) of CO_2 ? What are the merits of using supercritical CO_2 as solvent? [1+2+2]
- Q.3(b) Differentiate between ionic liquid (IL) and molten salts. Write an IL-mediated multistep synthesis. [2+3]
- Q.4(a) Compare and contrast *Microwave assisted* chemical synthesis vs *conventional* (heating based) chemical synthesis. Highlight the advantages of the former over the later. [5]
- Q.4(b) Discuss why microwave assisted extraction (MAE) methods are most suitable for extraction of *thermolabile* compounds from plant matrix. Elaborate with relevant chemical reaction, the advantages of microwave assisted oxidation of toluene to benzoic acid against the conventional method. [3+2]
- Q.5(a) What is PERC used in drycleaning of textiles? How use of PERC is safer than kerosene/gasoline as solvent? What are the effects of PERC on (a) human health (b) Environment [5]
- Q.5(b) What are VOCs? Mention their important uses. What damage VOCs can cause to the environment? Discuss how use of the paint *paris green* can lead to arsenic poisoning? [1+2+2]

:::::21/07/2023:::::