

Ex/SC/CHEM/UG/DSE/TH/02/2022(S)

B. SC. CHEMISTRY EXAMINATION, 2022

(3rd Year, 6th Semester, CBCS, Supplementary)

CHEMISTRY

PAPER – DSE/CHEM/TH/02

GREEN CHEMISTRY - I + GREEN CHEMISTRY - II

Time : Two hours

Full Marks : 40

(20 marks for each unit)

Use a separate answer script for each unit.

UNIT – 6021-O

Answer must be brief and to-the-point.

1. a) Elaborate **any one** of the “Twelve Principles of Green Chemistry” with specific example. 4
- b) What is meant by Pictogram? Mention its importance. 2+2
- c) One mole of *p*-phenylenediamine (1, 4-diaminobenzene), on grinding with two moles of *p*-hydroxybenzaldehyde in the absence of any solvent and catalyst, produces *bis*-imine with 95% yield. Calculate the atom economy of this process and comment on its greenness. 2+2
- d) Draw the phase diagram of carbon dioxide and indicate the region for supercritical carbon dioxide. Also highlight the green context of supercritical carbon dioxide. 2+2

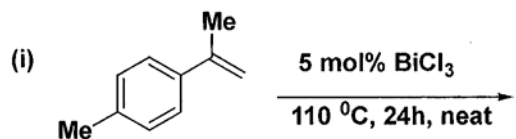
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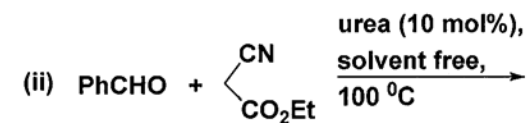
- e) Mention one example of water-soluble radical initiator along with its application in an organic transformation in aqueous medium with mechanistic details. 1+3

UNIT – 6022-O

2. a) What is the basic difference between ‘on water’ and ‘in water’ organic reactions? Which one is usually faster and why? $1\frac{1}{2}$
- b) What is antifoulant? Write the structure of a green antifoulant. What was the earlier used organometallic antifoulant? Discuss any two (at least one on risk factor) of each in terms of demerits of the non-green one and the merits of the green one. 3
- c) Outline the biological synthesis of adipic acid from D-glucose. $2\frac{1}{2}$
- d) Write the structure(s) of the product(s) depicting mechanism and mentioning major/minor in relevant case. $2 \times 1\frac{1}{2}$



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3. a) Define the following terms associated to the mechanism of MW interaction with the substances:
i) Subsectors ii) Hot spots 1+1
- b) Why is microwave-assisted chemical transformation a non-ionizing process? 1
- c) Give an example of surfactant for super critical carbon dioxide (scCO₂). 1
- d) What do you mean by interesterification of fats or oils? How does interesterification of triglycerides take place in chemical method? 1+2
- e) How does ‘cavitation theory’ explain the acceleration of metal mediated reaction under the sonochemical reaction condition? 2
- f) What do you mean by ‘Elutriation’? 1