

Total No. of Printed Pages—4

**5 SEM TDC DSE CHM (CBCS) 2 (H)**

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( Held in January/February, 2022 )

**CHEMISTRY**

( Discipline Specific Elective )

( For Honours )

Paper : DSE-2

( **Green Chemistry** )

Full Marks : 53

Pass Marks : 21

Time : 3 hours

*The figures in the margin indicate full marks  
for the questions*

1. Choose the correct answer : 1×6=6

(a) The Bhopal Disaster (1984) was  
occurred due to

(i) methyl cyanide

(ii) methyl isocyanide

(iii) methyl isocyanate

(iv) methyl cyanate

(b) The Japanese disease *Itai-Itai* has been  
attributed to

(i) lead poisoning

(ii) mercury poisoning

(iii) cadmium poisoning

(iv) arsenic poisoning

( 2 )

- (c) 12 green chemistry principles are postulated by
- Professor Paul T. Anastas
  - Professor John C. Warner
  - Professor Paul T. Anastas and Professor John C. Warner
  - Professor John R. Asthana
- (d) The formula of adipic acid is
- $\text{HOOC}-(\text{CH}_2)_2-\text{COOH}$
  - $\text{HOOC}-(\text{CH}_2)_6-\text{COOH}$
  - $\text{HOOC}-(\text{CH}_2)_4-\text{COOH}$
  - $\text{HOOC}-(\text{CH}_2)_3-\text{COOH}$
- (e) Which of the following reactions is an example of microwave-assisted reaction in water?
- Hoffmann elimination
  - Oxidation of toluene
  - Oxidation of alcohol
  - All of the above
- (f) An efficient, green synthesis of a compostable and widely applicable plastic made from corn is
- polylactic acid
  - polyacetic acid
  - polyvinyl chloride
  - polyacrylic acid

( 3 )

2. Answer any *ten* of the following questions : 2×10=20
- Explain the term 'green chemistry'.
  - What are the goals of green chemistry?
  - Define atom economy.
  - How can you improve the atom economy of a reaction?
  - How can you compare the greenness of solvents?
  - What is chemoselective reaction? Give one example of it.
  - What is enantioselective reaction? Give one example of it.
  - Write the reactions involved during the depletion of ozone layer by CFCs.
  - Write the green approach of synthesis of adipic acid.
  - Write the alternative approach to Strecker synthesis for the synthesis of disodium iminodiacetate (DSIDA).
  - Write the greener approach to the Bhopal Gas Tragedy.
  - What are solid-state reactions? Give one example.
3. Write short notes on any *three* of the following : 3×3=9
- Principles of green chemistry
  - Ionic liquids as green solvents

- (c) supercritical carbon dioxide
- (d) Protection of a functional group

4. Answer any *three* of the following questions :

3×3=9

- (a) Compare the oxidation of toluene and oxidation of alcohols using microwave conditions in water with other conventional procedures.
- (b) Compare the Simmons-Smith reaction using ultrasound conditions with other conventional procedures.
- (c) How can we design the environmentally safe marine antifoulant?
- (d) Write a note on surfactants for carbon dioxide.

5. Answer any *three* of the following questions :

3×3=9

- (a) What will be the future trends in green chemistry in the field of oxidative transformations and catalysis?
- (b) "Green chemistry is sustainable chemistry." Explain the statement.
- (c) What will be the future trends in green chemistry in the field of biominimetic, multifunctional reagents?
- (d) What will be the future trends in green chemistry in the field of proliferation of solventless reactions?

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