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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

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(Turn Over)

(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

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(Continued)

(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

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- (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 biomimetic, multifunctional reagents?
- (d) What will be the future trends in green chemistry in the field of proliferation of solventless reactions?
