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

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(Nov/Dec)

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) What is the primary goal of green chemistry?

- (i) To reduce the cost of chemical production
- (ii) To increase the yield of chemical reactions
- (iii) To develop new chemical products
- (iv) To reduce the environmental impact of chemical production and use

(2)

- (b) Which of the following is a principle of green chemistry?
- (i) Use of toxic solvents
 - (ii) Atom economy
 - (iii) Generation of hazardous waste
 - (iv) Use of nonrenewable resources
- (c) Which of the following solvents is considered a green solvent?
- (i) Benzene (ii) Chloroform
 - (iii) Water (iv) Dichloromethane
- (d) What is the benefit of using renewable feedstock in green chemistry?
- (i) Increased dependence on non-renewable resources
 - (ii) Reduced environmental impact
 - (iii) Increased cost production
 - (iv) Decreased product yield
- (e) The formula of adipic acid is
- (i) $\text{HOOC}-(\text{CH}_2)_2-\text{COOH}$
 - (ii) $\text{HOOC}-(\text{CH}_2)_3-\text{COOH}$
 - (iii) $\text{HOOC}-(\text{CH}_2)_4-\text{COOH}$
 - (iv) $\text{HOOC}-(\text{CH}_2)_6-\text{COOH}$
- (f) Which of the following reactions is an example of microwave-assisted reaction in water?
- (i) Hofmann elimination
 - (ii) Oxidation of toluene
 - (iii) Oxidation of alcohol
 - (iv) All of the above

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(Continued)

(3)

2. Answer any ten of the following questions :
2×10=20
- (a) Define atom economy.
 - (b) Mention two goals of green chemistry.
 - (c) What is the role of catalysis in green chemistry?
 - (d) What is the significance of the twelve principles of green chemistry?
 - (e) What is the role of green chemistry in reducing pollution?
 - (f) Why is green chemistry important for sustainability?
 - (g) How can you improve the atom economy of a reaction?
 - (h) How can you compare the greenness of solvents?
 - (i) Write the reactions involved during the depletion of ozone layer by CFCs.
 - (j) Write the green approach of synthesis of adipic acid.
 - (k) Write the greener approach to the Bhopal Gas Tragedy.
 - (l) What are solid-state reactions? Give one example. 1+1=2
3. Write short notes on any three of the following :
3×3=9
- (a) Ionic liquids as green solvents
 - (b) Supercritical CO_2

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(Turn Over)

- (c) Protection of a functional group
- (d) Principles of green chemistry

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

3×3=9

- (a) Write a note on surfactants for CO₂.
- (b) Compare the Simmons-Smith reaction using ultrasound conditions with other conventional procedures.
- (c) How can we design the environmentally safe marine antifoulant?
- (d) Compare the oxidation of toluene and oxidation of alcohols using microwave conditions in water with other conventional procedures.

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

3×3=9

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

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