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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) The Minamata disease has been attributed to

- (i) lead poisoning
- (ii) arsenic poisoning
- (iii) cadmium poisoning
- (iv) mercury poisoning

- (b) The 'methaemoglobinaemia' (blue baby syndrome) has been attributed to
- (i) nitrous oxide poisoning
 - (ii) nitrite poisoning
 - (iii) nitrate poisoning
 - (iv) carbon monoxide poisoning
- (c) The concept of 'atom economy' was developed by
- (i) Paul T. Anastas
 - (ii) John C. Warner
 - (iii) B. M. Trost
 - (iv) John R. Asthana
- (d) The addition of HBr to propene is an example of
- (i) chemoselective reaction
 - (ii) regioselective reaction
 - (iii) enantioselective reaction
 - (iv) diastereoselective reaction

- (e) Solar energy is considered to be a
- (i) renewable source of energy
 - (ii) non-renewable source of energy
 - (iii) Both renewable and non-renewable sources of energy
 - (iv) None of the above
- (f) Which of the following is considered as green solvent?
- (i) Supercritical CO₂
 - (ii) Ionic liquids
 - (iii) Water
 - (iv) All of the above

UNIT—I

2. Answer the following questions (any seven) :

2×7=14

- (a) What is Bhopal Gas Tragedy? Write the greener approach to the Bhopal Gas Tragedy.

1+1=2

(4)

- (b) Write one 100% atom economical reaction.
- (c) What is regioselective reaction? Give one example of it. $1+1=2$
- (d) What is diastereoselective reaction? Give one example of it. $1+1=2$
- (e) Mention four advantages of using biocatalysis in relevance to green chemistry. $\frac{1}{2} \times 4 = 2$
- (f) Write the green approach of synthesis of methyl methacrylate with 100% atom economy.
- (g) Write a method of preparation of urethane eliminating the use of hazardous chemical, phosgene.
- (h) Give one example of Hofmann elimination using microwave irradiation.

UNIT—II

3. Answer the following questions (any five) :

3×5=15

- (a) Explain any two principles of green chemistry. $1\frac{1}{2}+1\frac{1}{2}=3$
- (b) Synthesis of 3°-alcohol from Grignard reagent gives 100% yield but the reaction is not considered to be a green synthesis. Explain.
- (c) What are solid-state reactions? Write the synthesis of imidazole using KSF clay under solvent-free conditions in microwave. $1+2=3$
- (d) What are sonication reactions? Explain with a suitable reaction. $1+2=3$
- (e) What is biocatalyst? Write the biocatalytic conversion of penicillin into 6-APA. $1+2=3$
- (f) "Catalysts can control the stereochemistry of a reaction." Explain with conversion of 2-butanone into (*R*)-alcohol with biocatalyst as a typical enantioselectivity of reduction.

UNIT—III

4. Answer the following questions (any *three*) :

3×3=9

- (a) Explain the green approach of synthesis of catechol. Why is it considered as green process? 2+1=3
- (b) Explain the green approach of synthesis of citral. Why is it considered as green process? 2+1=3
- (c) Explain the green approach of synthesis of paracetamol. Why is it considered as green process? 2+1=3
- (d) Explain the green approach of conversion ethanol into ethanoic acid. Why is it considered as green process? 2+1=3

UNIT—IV

5. Answer the following questions (any *three*) :

3×3=9

- (a) Mention some green chemistry works towards sustainability.

- (b) Mention some guidelines to be followed to control the pollution due to industrial effluents.
- (c) What will be the future trends in green chemistry in the field of catalysts?
- (d) What will be the future trends in green chemistry in the field of multi-functional reagents?
