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

2022

(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 CO_2

(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

(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. ½×4=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.

(Continued)

UNIT—II

3. Answer the following questions (any *five*) : 3×5=15

(a) Explain any two principles of green chemistry. 1½+1½=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 stereo-chemistry of a reaction." Explain with conversion of 2-butanone into (*R*)-alcohol with biocatalyst as a typical enantioselectivity of reduction.

(Turn Over)

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?

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