

(7 pages)

Reg. No. :

Code No. : 5409

Sub. Code : ZCHE 11

M.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2023

First Semester

Chemistry

Elective—GREEN CHEMISTRY—TECHNIQUES AND APPLICATIONS

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Aim of Green chemistry is _____
- (a) Design chemical products and process that maximize profits
 - (b) Design safer chemical products and processes that reduce or eliminate the use and generation of hazardous substances
 - (c) Design chemical products and processes that work most efficiently
 - (d) Utilize non-renewable energy

6. What is the solvent used for Diels-Alder reaction in Green synthesis?
- (a) Formaldehyde
 - (b) Ethanol
 - (c) Water
 - (d) Benzene
7. Photolysis of benzophenone (in sunlight) in presence of an alcoholic solvent (preferably isopropyl alcohol) gives _____
- (a) Benzopinacol
 - (b) Benzoic acid
 - (c) Benzyl alcohol
 - (d) Phenol
8. Which of the following is used as a Friedel-Crafts catalyst?
- (a) Anhydrous Aluminium chloride
 - (b) Aluminium Flouride
 - (c) Tungsten
 - (d) Activated charcoal
9. Which among the following have a large amount of installed grid interactive renewable power capacity in India?
- (a) Biomass power
 - (b) Wind power
 - (c) Solar power
 - (d) Small Hydro power

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2. Green chemistry reduces the use of _____
- (a) Energy
 - (b) Liquid fuels
 - (c) Gaseous fuels
 - (d) Solid fuels
3. Which one is not the advantage of zeolite catalysed Friedel-Crafts acylation?
- (a) No solvent is required
 - (b) 0.035 kg aqueous effluent per kg instead of 4.5 kg aqueous effluent per kg
 - (c) Greater than 95% yield of higher purity instead of 85– 95% yield in traditional method
 - (d) Hydrolysis of products and phase separation is necessary
4. Name the enzyme which catalyzes the oxidation-reduction reaction?
- (a) Transaminase
 - (b) Glutamine synthetase
 - (c) Phosphofructokinase
 - (d) Oxidoreductase
5. Universal solvent is
- (a) Formaldehyde
 - (b) Water
 - (c) Ethanol
 - (d) Benzene

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10. Which of the following is not a disadvantage of Hydro Power?
- (a) A large land area submerges into the water leading to deforestation
 - (b) It causes dislocation of a large population and rehabilitation
 - (c) It causes ecological disturbances like earthquake
 - (d) It causes calamities like landslides

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) (i) How can we reduce non-renewable resources?
- (ii) How do you calculate mass intensity?
- Or
- (b) (i) How do you calculate E factor in green chemistry?
- (ii) What does a low E factor Mean?

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[P.T.O.]

Answer ALL questions, choosing either (a) or (b).

16. (a) Explain the twelve Principles of Green Chemistry.

Or

- (b) Write notes on alternate energy sources and efficient energy improvements.

17. (a) Discuss the applications of zeolites, silica, alumina and clay catalysts in green chemical reactions.

Or

- (b) Discuss the applications of crown ethers in oxidation, substitutions, elimination and esterification reactions.

18. (a) Explain the role of solvents in synthesis.

Or

- (b) Write any two reactions using super critical carbon dioxide and two reactions using super critical water.

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12. (a) (i) What are the advantages of green catalysts?

- (ii) Why enzyme is a green catalyst?

Or

- (b) What is bio-catalysis? Discuss the role of enzymes in catalytic oxidation and catalytic reduction.

13. (a) Explain Aqueous Phase Diels Alder reaction

Or

- (b) Write notes on Claisen rearrangement.

14. (a) Give a brief note Photoreduction reactions.

Or

- (b) (i) What is Strecker synthesis?

- (ii) Discuss the mechanism of Strecker synthesis

15. (a) Write notes on renewable energy sources.

Or

- (b) Give a brief account of hydroelectric and geothermal Power.

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19. (a) Discuss the effects of solvents on microwave assisted synthesis.

Or

- (b) (i) What do you mean by sonochemistry?

- (ii) Discuss the Principle of sonochemistry

- (iii) Write notes on ultra sound assisted Cannizzaro reaction

20. (a) Explain the Principle, Types and Applications of Fuel Cells.

Or

- (b) Write note on

- (i) Hydroelectric Power

- (ii) Biomass

- (iii) Wind Power and

- (iv) Geothermal power

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