

(7 pages)

Reg. No. :

Code No. : 5806

Sub. Code : WCHE 22

M.Sc. (CBCS) DEGREE EXAMINATION,
APRIL 2024.

Second Semester

Chemistry – Elective

GREEN CHEMISTRY

(For those who joined in July 2023 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (15 × 1 = 15 marks)

Answer ALL questions.

Choose the correct answer :

1. The 12 Principles of green chemistry was outlined by
- (a) Paul Anastas
 - (b) Mark Holtzapple
 - (c) Nypro Rohm
 - (d) Bush Donlar

2. Effective mass yield =

- (a) Mass of desired product / total mass of non-benign reactants
- (b) Mass of actual waste / mass of desired product + 1
- (c) Total mass of material used/ mass of product obtained
- (d) Mass of product obtained / total mass of reactants × 100

3. What is a key advantage of using renewable feedstocks?

- (a) They are cheaper than non-renewable feedstocks
- (b) They reduce greenhouse gas emissions
- (c) They are available in unlimited quantities
- (d) They help conserve non-renewable resources

4. Catechol can be synthesized from Guaiacol by

- (a) Isomerisation
- (b) Transesterification
- (c) Trans etherification
- (d) Dehydrogenation



5. Supercritical carbon dioxide is used in
(a) Decaffeination of coffee
(b) Dissolving hydrocarbons
(c) Agriculture
(d) Mining
6. Noyori's synthesis of adipic acid uses
(a) Caprolactum (b) Cyclohexanone
(c) Cyclohexane (d) Cyclohexene
7. Increase in level of carbon-dioxide in atmosphere causes
(a) Global warming (b) Ozone depletion
(c) Cooling (d) Acid rain
8. Vanadium silicate is an example of
(a) Acid catalyst
(b) Basic catalyst
(c) Oxidation catalyst
(d) Polymer supported catalyst
9. Polystyrene-Aluminium chloride catalyst is
(a) Toxic and non-recyclable
(b) Needed in stoichiometric quantities
(c) Benign, efficient and ecofriendly
(d) Decomposes at high temperature

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10. Sodium salts can be dissolved in organic solvents using _____.
(a) 15-crown-5 (b) 18-crown-6
(c) 12-crown-4 (d) 21-crown-7
11. The cavity inside crown ethers is _____.
(a) Hydrophobic (b) Hydrophilic
(c) Electrophobic (d) Nucleophilic
12. Crown ethers cannot assist in _____ reactions.
(a) Esterification (b) Saponification
(c) Displacement (d) Polymerisation
13. The main principle of ultrasonication is based on generating high-frequency ultrasonic sound that results in _____ phenomenon.
(a) Refraction (b) Diffraction
(c) Cavitation (d) Dispersion
14. Which of the following changes take place when molecules absorb MW radiation?
(a) Electronic (b) Vibrational
(c) Rotational (d) Magnetic

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[P.T.O.]



15. The transducer in a sonicator generates
(a) UV radiation (b) Microwaves
(c) IR radiation (d) Ultrasonic waves

PART B — (5 × 4 = 20 marks)

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

Each answer should not exceed 250 words.

16. (a) Define the terms (i) Atom Economy
(ii) Effective mass yield with examples.

Or

- (b) Describe Flixborough accident and Bhopal gas tragedy.

17. (a) Give examples of green chemistry in day-to-day life.

Or

- (b) Describe the properties of ionic liquids.

18. (a) What are basic catalysts? Give examples of reactions with basic catalysts.

Or

- (b) Write a short note on polymer supported photosensitizers.

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19. (a) Giving examples and explain the role of PTC in organic synthesis.

Or

- (b) Explain how crown ethers assist in displacement reactions.

20. (a) Explain Cavitation theory.

Or

- (b) What are the advantages of ultrasound assisted reactions?

PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

21. (a) What are the twelve principles of green chemistry?

Or

- (b) Describe briefly the need for green chemistry.

22. (a) Give examples of reactions in green solvents-water and scCO_2 .

Or

- (b) Discuss the methods of preparing ionic liquids.

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23. (a) What are oxidation catalysts? Explain their role in reactions.

Or

- (b) What are greenhouse gases? Explain how they cause global warming and remedial measures.

24. (a) Explain how crown ethers facilitate saponification and anhydride formation with examples.

Or

- (b) Explain how crown ethers facilitate esterification and elimination with examples.

25. (a) Describe in detail the components of ultrasonic reactor.

Or

- (b) Explain the principle in microwave heating and give few examples of MW assisted reactions.

