TDC (CBCS) Odd Semester Exam., 2023

CHEMISTRY

(5th Semester)

Course No. : CHMDSE-503T

(Green Chemistry)

Full Marks : 50
Pass Marks : 20

Time : 3 hours

The figures in the margin indicate full marks for the questions

SECTION—A

Answer *fifteen* questions, selecting any *three* from each Unit : 1×15=15

UNIT—I

1. What was the reason for Flixborough disaster?

2. What is green chemistry?

3. Which chemical is responsible for methemoglobinemia?

4. What causes Itai-Itai disease?

UNIT—II

5. Who is known as the father of green chemistry?

6. Arrange the following steps into correct sequence :

   If in a reaction hazardous waste is generated, it has to be

   (a) disposed

   (b) treated

   (c) separated

7. Fill in the blank :

   It is better to _____ waste than to treat or cleanup waste.

8. Write one prevention technique of hazardous product.

UNIT—III

9. What is dry ice?

10. What is ionic liquid?

11. Why is water considered as one of the good examples of green solvents?

12. What are biodegradable and non-biodegradable products?

UNIT—IV

13. What is a solid-state reaction?

14. What is the frequency range of microwave?

15. Write any one important property of solvent used in microwave-assisted reactions.

16. Give one example of microwave-assisted reaction in water.

UNIT—V

17. What is the frequency range of ultrasound used in chemical synthesis?

18. What is Clayan?

19. Why are tellurium mediated organic transformations environment-friendly?

20. How is Te^{2-} formed from Te° during organic synthesis?

SECTION—B

Answer *five* questions, selecting *one* from each Unit : 2×5=10

UNIT—I

21. What are the goals of green chemistry?

22. What is global warming? Write its effects. 1+1=2

UNIT—II

23. Give one example of each of the following :

(a) Chemoselectivity

(b) Diastereoselectivity

24. What do you mean by selectivity? Give one example of enantioselectivity.

UNIT—III

25. What is an auxiliary substance? Give two examples. 1+1=2

26. What are green solvents? Give two examples. 1+1=2

UNIT—IV

27. What are the advantages of using microwave reactor in a green synthesis?

28. Show the green synthesis of adipic acid from D-glucose.

UNIT—V

29. *(a)* Why is ultrasonic-assisted organic synthesis more advantageous than the conventional method? 1

(b) Show oxidation state of tellurium at different stages of tellurium mediated organic synthesis. 1

30. Show ultrasound assisted saponification reaction.

SECTION—C

Answer *five* questions, selecting *one* from each Unit : 5×5=25

UNIT—I

31. Why do we need green chemistry? What are different limitations in implementation of green chemistry? 2+3=5

32. Write short notes on the following : 3+2=5

(a) Bhopal disaster

(b) Uses of chlorofluorocarbon (CFC) and its effect on environment

UNIT—II

33. Write the twelve principles of green chemistry.

34. Discuss the concept of atom economy in detail.

UNIT—III

35. Discuss about all the important considerations for designing a green synthesis.

36. What are the possible modes for supplying energy to a reaction in a green synthesis? Discuss in detail.

UNIT—IV

37. *(a)* Write the following reactions under microwave irradiation in water : 1½×2=3

(i) Hofmann elimination

(ii) Hydrolysis of benzyl chloride to benzyl alcohol

(b) How is disodium iminodiacetate (DSIDA) obtained by Strecker process? What is the drawback of this process? How is it obtained by green synthesis? 2

38. *(a)* Write the reactions of the following under microwave irradiation in solvents : 1½×2=3

(i) Fries rearrangement

(ii) Diels-Alder reaction

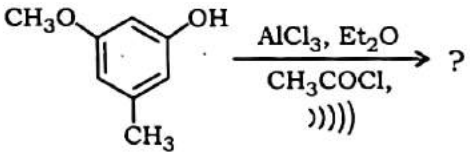
(b) Carry out hydrolysis of benzamide by green method. How is this method superior to usual hydrolysis? 2

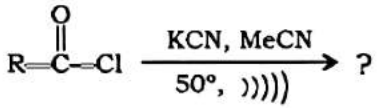
UNIT—V

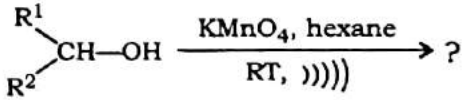
39. Write the products of the following reactions : 1×5=5

(i) $RCOOH + R'OH \xrightarrow[)))))]{H_2SO_4,\ RT} ?$

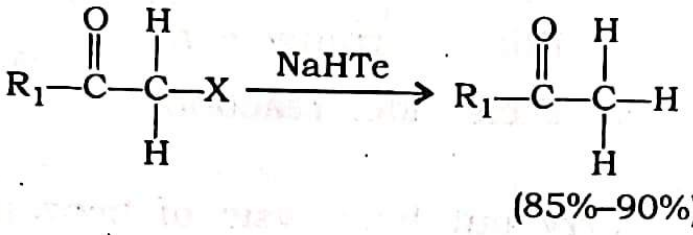
(ii) $C_6H_5Br \xrightarrow[)))))]{Li,\ THF} ?$

(iii) 

(iv) 

(v) 

40. *(a)* Show the mechanisms of the following reactions : 2



(b) Write the following tellurium mediated organic transformations : 1½×2=3

(i) Coupling of allylic halides

(ii) Synthesis of biaryls.

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