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

**2024**

( November )

**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) 12 green chemistry principles are postulated by

(i) Professor Paul T. Anastas

(ii) Professor John C. Warner

(iii) Professor Paul T. Anastas and  
Professor John C. Warner

(iv) Professor John R. Asthana

(b) In 1962 Rachel Carson wrote the book, *Silent Spring* illustrating about how to use

(i) CFC

(ii) DDT

(iii) BOD

(iv) BHC

(c) The Japanese Itai-itai disease has been attributed to

(i) lead poisoning

(ii) mercury poisoning

(iii) cadmium poisoning

(iv) arsenic poisoning

(d) An efficient green synthesis of a compostable and widely applicable plastic made from corn is

(i) polylactic acid

(ii) polyacetic acid

(iii) polyvinyl chloride

(iv) polyacrylic acid

(e) Which of the following reactions is an example of microwave assisted reaction in water?

- (i) Hofmann elimination
- (ii) Oxidation of toluene
- (iii) Oxidation of alcohol
- (iv) All of the above

(f) Which of the following is considered as green solvent?

- (i) Water
- (ii) Ionic liquids
- (iii) Super critical CO<sub>2</sub>
- (iv) All of the above

2. Mention two goals of green chemistry. 2

3. Answer the following questions (any five) : 2×5=10

(a) All rearrangement reactions are 100% atom economical reactions. Explain with a suitable example. 2

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- (b) What are enantioselective reactions?  
Give one example of it.  $1+1=2$
- (c) Why are ionic liquids considered as  
green solvent? 2
- (d) What are sonication reactions? Give  
one example.  $1+1=2$
- (e) Mention the advantages of using  
enzymes in relevance to green  
chemistry. 2
- (f) Mention two ways for minimize the  
energy requirement for any synthetic  
process. 2

4. Answer the following questions (any three) :  $3 \times 3 = 9$

- (a) Explain any two principles of green  
chemistry.  $1\frac{1}{2} + 1\frac{1}{2} = 3$
- (b) What are sonication reactions? Explain  
with suitable reaction. 3
- (c) What is biocatalyst? Write the  
biocatalytic conversion of penicillin  
into 6-APA.  $1+2=3$

(d) "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.  $1+2=3$

5. Compare the oxidation of toluene and oxidation of alcohols using microwaves conditions in water with other conventional procedures.  $2+2=4$

6. Answer the following questions (any *three*) :  $2 \times 3 = 6$

(a) Write the reactions involved during the depletion of ozone layer by CFCs.

(b) Write the green way to Strecker synthesis for the synthesis of disodium iminodiacetate (DSIDA).

(c) Explain the green synthesis of Diels-Alder reaction.

(d) How can you compare the greenness of solvents?

7. Answer the following questions (any two) :  $3\frac{1}{2} \times 2 = 7$

(a) Explain the green approach of synthesis of Paracetamol. Why is it considered as green approach?  $2\frac{1}{2} + 1 = 3\frac{1}{2}$

(b) Explain the green approach of synthesis of citral. Why is it considered as green process?  $2\frac{1}{2} + 1 = 3\frac{1}{2}$

(c) Explain the green approach of synthesis of Catechol. Why is it considered as green process?  $2\frac{1}{2} + 1 = 3\frac{1}{2}$

8. Answer the following questions (any three) :  $3 \times 3 = 9$

(a) "Green chemistry is considered as sustainable chemistry." Explain with a suitable example.

(b) What will be the future trends in green chemistry in the field of catalysts?

- (c) What will be the future trends in green chemistry in the field of proliferation of solventless reactions?
- (d) Mention some guidelines to be followed to control the pollution due to industrial effluents.

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