2026

Chemistry

Paper : CH-205

(Green Chemistry)

Full Marks : 40

Time : 2 hours

The figures in the margin indicate full marks for the questions.

1. Choose the correct option : 1×4=4

a) The use polyactic acid is associated with which of the following principle of Green Chemistry ?

i) Safer solvents and auxiliaries

ii) Designing safer degradation

iii) Design for degradation

iv) Design for energy efficiency

b) Which of the following is a bio-based green solvent derived form agriculture waste ?

i) Benzene ii) Ethanol

iii) Formaldehyde iv) Furfural

c) What does NOAEL stands for ?

i) New Observed Active Effect Level

ii) No Observed Adverse Effect Level

iii) Non-Ordered Acute Effect Limit

iv) Non-Ordered Adverse Effect Limit

c) Which of the following is considered as an ideal highly sustainable biocatalyst ?

i) Zeolites ii) TiO_2

iii) Enzymes iv) MOFs

Contd..

2. Answer the following questions ***(any four)*** : 4×4=16

a) i) Which is better – a process with high product yield or a process with high atom economy and why ? 2

ii) A reaction produces 40g of desired product and 5g of waste. Calculate the *E*-factor. 2

b) What are platform molecules ? Name two key platform molecules derived from biomass and give their structures. 1+3=4

c) Define toxicity and hazard. Illustrate two methods of identifying chemical hazards. 2+2=4

d) Explain the concept of waste prevention and waste minimization techniques in green chemistry. 4

e) Mention the negative effects that dangerous chemicals have on the ecosystem and offer two green chemstry alternatives to address the effects. 2+2=4

3. Answer the following questions ***(any four)*** : 5×4=20

a) What are the major constituents of lignocellulosic biomass ? Discuss the utilization of biomass as renewable feedstock for conversion to value-added products. 2+3=5

b) Explain how CO_2 can be utilized to convert into useful fuels and chemicals. 5

c) Describe the concept of designing materials for energy efficiency in green chemistry. 5

d) Explain how green chemistry principles help in achieving sustainable development with suitable examples. 5

e) Write short notes on : 3+2=5

i) Green metrics applied to organic synthesis

ii) Water oxidation catalysts

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