Total Number of printed pages- 4

(Sem-3) SEC

2024

CHEMISTRY

Paper Code : SEC0311903

(Green Chemistry)

Full Marks : 30

Time : $1\frac{1}{2}$ hours

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

1. Answer any Five of the following question $1 \times 5 = 5$

   a) Who wrote the book "Green Chemistry: Theory and Practice"?

   b) What is atom economy?

   c) What is zero-waste technology?

   d) Give an example of green alternative for polyacrylate (PAC).

   e) State 11th principle of green chemistry.

   f) Mention two uses of Paracetamol.

   g) From which compound, we can synthesize Catechol in greener way?

Contd.

2. Answer any Five. $2\times5 = 10$

a) Write a green method for synthesizing anisole (methoxybenzene) from phenol.

b) $CH_3CH_2OH + SOCl_2 \rightarrow CH_3CH_2Cl + SO_2 + HCl$
Despite of 100% yield, the above reaction is not considered green. Explain.

c) What is catalyst? What are different types of catalyst?

d) How nitrous oxide cause the destruction of ozone layer? Write the necessary reactions.

e) Explain the health concerns related to the conventional synthesis of Adipic Acid.

f) Write down the scheme of synthesis of Benzyl Bromide that gives 100% yield.

g) Write a short note on the following (any one)
   i) Bhopal gas tragedy.
   ii) Minamata disease
   iii) Chernobyl disaster

h) Find atom economy for the following reaction (any one)
   i) Methyl iodide reacts with sodium methoxide to give dimethylether.
   ii) Isopropyl bromide in presence of sodium ethoxide gives 2-methyl-prop-1-ene.
   iii) Butadiene reacts with but-2-ene to give 4,5-dimethylcyclohexene.

3. Answer any Three. $5\times3 = 15$

a) What is atom utilization? With example show that addition reactions are more economical than substitution reaction. (1+4)

b) What is E-factor? Why catalytic oxidation process is environmentally more benign than stoichiometric oxidation? Give examples.

c) Write differences between conventional heating and microwave heating.

d) Explain using synthetic methodology, how MTHF is green solvent whereas THF is not.

e) Write down the conventional method of synthesis of Adipic Acid and write down the greener method. What is the solvent used in greener method. (2+2+1)

f) Write down the conventional method and green method of synthesis of 4-aminodiphenylamine. Who developed this reaction? (2+2+1)

g) Write down the conventional method and green method of synthesis of paracetamol. Mention the name of the greener reaction. (2+2+1)