B.Sc. Semester-V Examination, 2022-23

CHEMISTRY [Honours]

Course ID : 51417 Course Code : UG/CHEM/504/DSE-2

Course Title : Green Chemistry (T2)

Time : 1 Hour 15 Minutes Full Marks : 25

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer any **five** of the following questions: 1×5=5

   a) Minamata disease is one of the first and most serious disease resulted by chemical_____

   b) Give one energy efficient process.

   c) What is the atom economy of the reaction? $C_2H_4+1/2O_2 \rightarrow C_2H_4O$ (Ethylene oxide).

   d) Ionic liquid is an ionic compound but exists as a liquid— why?

   e) Write one advantage of using fluorous solvent in a chemical reaction.

   f) What are the 3 types of sustainability?

   g) What is biomimetic approach to green chemistry?

   h) Give an example of green organic reaction having 100% atom economy.

2. Answer any **two** of the following questions: 5×2=10

   a) Give any one example in each of the following cases, stating the green chemistry principle involved: 1×5

      i) Ultrasonic reaction (Chenrical equation)

      ii) Rightfit pigment (structure)

      iii) Ionic liquid (formula)

      iv) Microwave-assisted reaction

      v) Analytical technique for real analysis for pollution prevention

   b) Do the following conversions considering the greener route: $2\frac{1}{2}\times2$

      i) Glucose to adipic acid

      ii) Corn to polylactic acid

   c) What is biocatalysis? Give two relevant advantages and two limitations of biocatalysts used in the chemical reaction. 1+(2+2)

d) Catalytic reaction is better than stoichiometric reaction— justify. How it affect the atom economy of the reaction? 3+2

3. Answer any **one** of the following question: 10×1=10

a) i) What are the differcnces between atom economy and E-Factor?

ii) The sun is considered as renewable resources of energy although the sun is decaying continuously. Again fossil fuel is considered as non-renewable source of energy although it is regeneratcd by nature— explain.

iii) The conventional synthesis of the drug, Ibuprofen, involves six steps with the % atom economy of 40%. The synthesis was replaced with a three step process and having % atom economy of 77%. Explain the role of % atom economy and number of steps involved in the acceptance of the replaced. 3+2+5=l0

b) i) What are the advantages and disadvantages of $scCO_2$ in place of organic solvent (at least 3 each)?

ii) What is PEG? Write its general formula. Mention advantage of PEG over water.

iii) Which green chemistry principle is being followed in this case? Give the principle of inherent safer design (ISD). Give one example.

3+(1+1+1)+(1+2+l)=10

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