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B.Sc. (CBCS) (Semester -V)
EXAMINATION NOVEMBER 2022
Chemistry
Green Methods & Safety Aspects in Chemistry

[Duration : 2 Hours]

[Total Marks :80]

Instruction :

- (1) All questions are compulsory.
- (2) Answers to the two sections to be written in separate answer books.
- (3) Figures to the right indicate full marks.

Section -A

Q.1. Answer Any four of the following 4x4=16

- i) Write briefly on the concept of atom economy giving a suitable example.
- ii) Define Catalysis. Mention the various advantages of using a catalyst in organic syntheses?
- iii) Mention any four ways by which working in the laboratory could be made more sustainable.
- iv) Briefly describe the synthesis of Polylactic Acid from corn.
- v) Discuss the extraction of D-limonene using supercritical CO₂.
- vi) Give any four applications of EPDM rubbers?

Q.2. A) i) State the safety principle of Green Chemistry and highlight its role with a suitable example. 4
ii) Describe the action of surfactant using a neat, labelled diagram of micelle structure of CO₂ surfactant. 2

OR

- iii) State the related principle and explain the need and advantages of using renewable feedstock. 4
- iv) Mention four advantages of using CO₂ as a solvent. 2

B) i) Explain the Mechanism of Phase transfer Catalysis using suitable example. 4
ii) Calculate the per cent atom economy of the following reaction 2
(Given At.wt. C=12 a.m.u., Ca =40 a.m.u., O= 16 a.m.u.)



- Q.3 A) i) Give the Principle and one application of Microwave assisted organic synthesis. 4
 ii) Explain the importance of designing a safer marine antifoulant. 2
 OR
 iii) Give the Principle and one application of Ultrasound technique in organic synthesis. 4
 iv) Name the greenest method of acetic acid manufacture. Give its two merits. 2
- B) i) Give the advantages and disadvantages of Eco-friendly Pesticides. 4
 ii) Mention the names of any four green chemistry institutes/organisations in the world. 2

Section –B

- Q.4 Answer any four of the following. 4x4=16
- What is a Material Safety Data Sheet (MSDS) and what information does the MSDS provide?
 - With the help of a diagram, explain dose-response curve of a toxic substance.
 - Discuss the measures for minimizing chemical waste.
 - List and explain different categories of chemicals that can cause health hazards in humans.
 - Provide a specific spill containment procedure for mercury and base spills.
 - What precautions are to be taken while working with low-or high-pressure systems in a laboratory?
- Q.5 A) i) Discuss the importance of safety equipments such as safety shower and eye wash station for handling emergencies in chemical laboratories. 4
 ii) Hazardous waste containers must be labelled with hazardous chemical waste tags. Explain why? 2
 OR
 iii) What are the four hazards and the hazard ratings shown on a National Fire Protection Association (NFPA) diamond? 4
 iv) What can be the consequences of mixing incompatible chemicals? 2
- B) i) What precautions are to be taken while working with flammable solvents? 4
 ii) What important information does the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) pictogram label provide? 2
- Q.6 A) i) Draw the fire tetrahedron and discuss the process involved in extinguishing fire. 4
 ii) When can the waste be classified as ignitable? 2
 OR
 iii) What are flammable liquids? Categorize these liquids with respect to their flash points. 4
 iv) What are the possible hazards associated when working with water bath? 2
- B) i) What precautions should be taken while handling a solid chemical waste? 4
 ii) What is the basic personal protective equipment required for working safely in chemical laboratory? 2