

Department of Chemistry
School of Chemical & Life Sciences, Jamia Hamdard
B.Sc.- MSc Integrated Programme, Semester-V Examination 2023
Paper code: BCH-DSE06 TH

Title: INDUSTRIAL CHEMICALS AND ENVIRONMENT

(Write your Roll No. at the top immediately on receipt of this question paper)

Time: 3 Hour

Maximum Marks: 75

Abbreviations Used

CLO- Course Outcome, PLO- Program Outcome, BTL- Bloom Taxonomy Level: BT level 1-Remember; BT level 2-Understand; BT level 3-Apply; BT level 4-Analyse; BT level 5-Evaluate, BT level 6-Create

Section A

Attempt All of the following (Very Short Type):

(20 x 1 = 20 m)

Q. No	Question	BTL	CLO	PLO
A1.	Which of the following is the disadvantages associated with production of hydal energy? (a) Huge capital cost, disastrous downstream floods (b) Disturbed marine ecology, nutrient, rich soil deposition (c) Brine corrosion, withdrawal of cold water from deep sea (d) Minor earthquake, generation of H ₂ O canal system	1/2	1/2	1/2
A2.	Which of the following options is not a type of reactor? (a) Light water reactor (b) High temp. Gas cooled reactor (c) Liquid Metal fast breeder reactor (d) Low temp. Gas cooled reactor	1/2	1/2	1/2
A3.	The tides in the sea occur due to the _____ effect of celestial bodies.	1/2	1/2	1/2
A4.	In geothermal energy, the primary source of heat production is the _____ of potassium, thorium, and uranium in the Earth's crust.	1/2	1/2	1/2
A5.	The commercial technique employed for oxygen production involves separating air through either a _____ process or vacuum swing adsorption.	1/2	1/2	1/2
A6.	The decomposition of organic molecules, along with _____ and geothermal vents, are among the sources contributing to the presence of sulphur in the sulphur cycle.	1/2	1/2	1/2
A7.	The nitrogen-fixing bacteria found in legume roots is known as _____.	1/2	1/2	1/2
A8.	Photochemical smog is created when UV rays interact with nitrogen oxide and _____ in the atmosphere.	1/2	1/2	1/2
A9.	The excessive absorbed energy that warms the Earth's surface is emitted as _____.	1/2	1/2	1/2
A10.	Provide an explanation of the two categories of air pollutants.	1/2	1/2	1/2
A11.	What is the definition of the term turbidity?	1/2	1/2	1/2
A12.	The primary constituents of fertilizer consist of -----.	1/2	1/2	1/2

A13.	Identify two odorless gases that are recognized as air pollutants.	1/2	1/2	1/2
A14.	State True or false. Correct it if false. A. Ozone is classified as a secondary pollutant since it forms through the reaction of sunlight, heat, nitrogen oxide, and volatile carbon-containing compounds. B. The ecosystem maintains crucial ecological processes, sustains life systems, and mitigates instability.	1/2	1/2	1/2
A15.	Naturally occurring borax is purified by (a) Distillation (b) Recrystallization (c) Ultra filtration (d) Centrifugation	1/2	1/2	1/2
A16.	What is the commonly used coagulant in water treatment, particularly for low colored water? (a) Potash alum (c) Hydrogen peroxide (b) Sodium thiosulphate (d) Chlorine	1/2	1/2	1/2
A17.	What is the name of the ultra-pure element required for semiconductor devices?	1/2	1/2	1/2
A18.	Which step is excluded from the rapid oxidation process of waste? (a) Waste Preparation (b) Combustion (c) Energy Recovery (d) Precipitation	1/2	1/2	1/2
A19.	Which gases contribute to the greenhouse effect? Please list three examples.	1/2	1/2	1/2
A20.	The intensity of photochemical smog is gauged by measuring the concentration of _____ and _____.	1/2	1/2	1/2

Section B

Long answer Type questions (Attempt any two out of four) (10x2=20 marks)

B1.	What is the chemical process underlying photochemical smog? Elaborate on its formation and the factors contributing to its origin.	5/6	5/6	5/6/7
B2.	How are global warming and the greenhouse effect related? What are the causal factors behind them?	5/6	5/6	5/6/7
B3.	Explain the different principles of Green Chemistry. Additionally, what are the drawbacks associated with the use of fossil fuels?	5/6	5/6	5/6/7
B4.	Elaborate on the process of biodiesel formation and provide a rationale for considering it as a green gas technology.	5/6	5/6	5/6/7

Section C

Short Type questions. (Attempt all questions) (7x5=35 marks)

C1	How does the protective ozone layer transition from being beneficial to becoming damaging, resulting in vegetation damage and exacerbation of asthma symptoms?	5/6	5/6	5/6/7
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OR

What is the significance of the size of particulate matter as an air pollutant? Additionally, provide techniques for treating such particulate matter.

- C2** What are the distinctions between nuclear fusion and nuclear fission? 4/5/6 4/5/6 4/5/6
- OR**
- What are the substances known as borax and bleaching powder? Please illustrate their molecular structures.
- C3** What is the definition of BOD (Biochemical Oxygen Demand), and how does it relate to pharmaceutical waste and metabolites? 5/6 4/5/6 4/5/6/7
- OR**
- Provide a brief overview of the different types of nuclear pollution. Additionally, explain the methods used for nuclear waste disposal.
- C4** Explain the Van Arkel method used to obtain ultra-pure metals. Also, mention their applications and provide examples. 3/4/5 3/4/5/6 3/4/5
- OR**
- List the applications, potential hazards, and recommended storage methods for hydrogen gas, helium gas, and neon gas.
- C5** Describe the industrial process for preparing chrome and potash alum. Additionally, provide information on their commercial applications. 3/4/5 3/4/5 3/4/5
- OR**
- What are the effects of pollution caused by carbon monoxide (CO), nitrogen dioxide (NO₂), carbon dioxide (CO₂), hydrogen sulfide (H₂S), and sulfur dioxide (SO₂)? Discuss the different methods used for estimation and control of these pollutants.
- C6** What is the industrial significance of argon? Describe the large-scale production process of argon. 3/4/5 3/4/5 3/4/5/6
- OR**
- Elaborate on the nitrogen biogeochemical cycle and its impact on environmental pollution.
- C7** List the properties and applications of sodium thiosulfate and hydrogen peroxide. 3/4 3/4/ 3/4
- OR**
- What is the definition of an ecosystem, and how does it function?
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