

BOWEN UNIVERSITY, IWO, OSUN STATE  
COLLEGE OF AGRICULTURE, ENGINEERING AND SCIENCE  
INDUSTRIAL CHEMISTRY PROGRAMME  
2021/2022 B.SC DEGREE SECOND SEMESTER EXAMINATION

Course Code: CHM 314

Course Title: Environmental Chemistry

Credits: 2

Date: 27/06/2023

Time Allowed: 2 Hours

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**INSTRUCTIONS:** SECTION A is COMPULSORY (30 Marks)

Answer one question in SECTION B (20 Marks)

Answer one question in SECTION C (20 Marks)

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**SECTION A**

**QUESTION 1**

- a. Explain briefly the roles of bacteria in the biogeochemical cycles of carbon, nitrogen and sulphur. (4 marks)
- b. Is the atmospheric level of CO<sub>2</sub> on decreasing or increasing trend currently? Explain. (4 marks)
- c. Using an illustrative diagram, discuss either the nitrogen or carbon or sulphur or water cycle. (5 marks)
- d. State two reasons why the troposphere could be considered a layer of greatest interest to an environmental chemist out of all the atmospheric layers. (2 marks)
- e. What is Environmental Pollution? (2 marks)
- f. COAES organized a one day sensitization tagged "Operation Feed the Nation: from Chemistry to Agriculture to Food Science and Technology" at the "Oja Oba" Central Market in Iwo. As a student of environmental chemistry identify:
  - i. three predominant environmental pollutants with such a gathering (3 marks)
  - ii. their various sources. (2 marks)
- g. Write briefly on the possible hazards of drinking water directly collected from the rain. Hence how can you make rain water suitable for domestic purposes? (8 marks)

**SECTION B**

**QUESTION 2**

- a. With the aid of a chemical equation, write a short note on the significance of CFCs (Chlorofluorocarbons) in stratospheric ozone layer depletion. (6 marks)
- b. State the form(s) in which carbon exists in
  - i. the atmosphere,
  - ii. water,
  - iii. rocks. (3 marks)
- c. Answer the following questions on Layers of the Atmosphere.
  - i. What is the basis for dividing the atmosphere into four layers? (1 mark)
  - ii. Does the temperature INCREASE or DECREASE with altitude in the:

- troposphere \_\_\_\_\_ stratosphere \_\_\_\_\_  
 mesosphere \_\_\_\_\_ thermosphere \_\_\_\_\_ (2 marks)
- iii. Which layer of the atmosphere is the closest to the Earth? (1 mark)
- iv. Which layer is the farthest away? (1 mark)
- d. Outline the TWELVE Principles of Green Chemistry. (6 marks)

### QUESTION 3

- a. i. Explain the term 'green chemistry'. (2 marks)
- ii. What are the environmental benefits of green chemistry? (2 marks)
- iii. Give two disadvantages of Green Chemistry. (2 marks)
- b. State the importance of ozone in the stratosphere. (2 marks)
- c. i. Define EIA (Environmental Impact Assessment). (2 marks)
- ii. Explain the purpose of "screening" in EIA process. (2 marks)
- iii. Discuss some of the challenges to effective implementation of Environmental Impact Assessment in Nigeria. (4 marks)
- d. List two basic processes of nitrogen cycle and discuss fully anyone of the processes. (4 marks)

### SECTION C

#### QUESTION 4

- a. Environmental pollution can distort the wellbeing of any eco-system.
- i. Justify this statement with an example of a named prominent air pollutant (2 marks)
- ii. Mention one of its sources (2 marks)
- iii. Mention two of its side effects (3 marks)
- iv. Mention one remedy or prevention for it. (1 marks)
- b. i. Mention two different pollutants (and their sources) that can be found at an abattoir, where cows are being killed for sale (4 marks)
- ii. Briefly state their disadvantages or effects (3 marks)
- iii. State their remedies (3 marks)
- iv. State their advantages (if any) (2 marks)

#### QUESTION 5

- a. i. What is water pollution? (2 marks)
- b. ii. State one major source of water pollution (2 marks)
- iii. State two of its effects (4 marks)
- iv. State a preventive measure or remedy (2 marks)
- c. i. What are greenhouse gases? (2 marks)
- ii. Cite two examples of such (4 marks)
- iii. State two different sources of them in your own immediate environment. (4 marks)