

The Assam Royal Global University, Guwahati

Royal School of Environmental and Earth Sciences (RSEES)

M.Sc. 1st Semester

Semester End Examination, December 2018

Course Title: Environmental Chemistry

Course Code: ENV164C102

Time: 3 Hours

Maximum Marks: 70

Note: Attempt all questions as per instructions given.

The figures in the right-hand margin indicate marks.

SECTION A

1. Attempt all questions. (Maximum word limit 50)

2 x 8

- What is common ion effect?
- Define catalysis citing examples.
- Explain the source of acidity in natural water.
- What is water hardness? What are the sources that contribute to hardness.
- Briefly explain soil permeability and its significance.
- What are the major macronutrients found in fertile soil?
- Define anti-knock compounds? Give two examples
- What are PCBs? Give examples.

SECTION B

2. Answer the following questions (any four)

3.5×4

- What is ionic product (K_w) of water. Find the pH value of 0.0001M NaOH.
- Define the solubility product citing examples. Write the difference between solubility product and ionic product.
- What do you mean by acid rain. Write the sources and effects of acid rain.
- Define adsorption. List the differences between physical adsorption and chemical adsorption.
- Define catalysis. Explain the various types of catalysis citing examples. Write the characteristics of a catalyst.

3. Answer the following questions (any four)

3.5×4

- Write a note on properties of marine water.
- Explain the various physical properties of terrestrial water.
- Define acidity? What are the various sources of acidity in natural and industrial water? What happens when water seeps through the layers of decaying organic matter? Briefly explain.
- What is carbonate system? Write the significance of carbonate system with major reactions involved.
- Define photochemical smog illustrating the chemical reactions leading to the formation of smog. Write the products of photochemical smog and their biochemical effects.

4. Answer the following questions (any four)

3.5×4

- Write a note on detergent action of soap.
- What do you mean by colloid? Give examples. Classify the various colloidal solutions mentioning their characteristics.
- Briefly explain the various physical properties of soil.
- What are the various micronutrients present in fertile soil? Explain the sources and functions of various micronutrients.
- Write a note on soil cation exchange capacity and soil pH.

5. Answer the following questions (any three)

4×3

- What are chlorofluorocarbons (CFCs)? Write a note on various sources and effects of CFCs in the environment.
- What are PCBs? Write the sources and effects of PCBs in the environment.
- Define herbicides? What are the major classes of herbicides? Write the suitable examples of each class.
- How biogas is generated? What are the various fermentation parameters of biogas production? Briefly explain the role of each parameter in generation of biogas.

1. Attempt all questions. (Attempt word limit 30)

- What is common ion effect?
- Explain catalysis giving examples.
- Explain the source of acidity in natural water.
- What is water hardness? What are the sources that contribute to hardness?
- Briefly explain soil permeability and its significance.
- What are the major micronutrients found in fertile soil?
- Define soil-plant compounds? Give two examples.
- What are PCBs? Give examples.

SECTION B

2. Answer the following questions (any four)

- What is toxic product (K_{sp}) of water? Find the pH value of 0.001M NaOH.
- Define the solubility product giving examples. Write the difference between solubility product and ion product.
- What do you mean by acid rain? Write the sources and effects of acid rain.
- Define adsorption. List the differences between physical adsorption and chemical adsorption.
- Define catalyst. Explain the various types of catalysts giving examples. Write the characteristics of a catalyst.

3. Answer the following questions (any four)

- Write a note on properties of organic water.
- Explain the various physical properties of terrestrial water.
- Define acidity? What are the various sources of acidity in natural and industrial water? What happens when water seeps through the layer of dissolving organic matter? Briefly explain.
- What is carbonate system? Write the significance of carbonate system with major reactions involved.
- Define photochemical smog illustrating the chemical reactions leading to the formation of smog. Write the products of photochemical smog and their biochemical effects.

4. Answer the following questions (any four)

- Write a note on classification of soap.
- What do you mean by colloid? Give examples. Classify the various colloidal solutions mentioning their characteristics.
- Briefly explain the various physical properties of soil.
- What are the various micronutrients present in fertile soil? Explain the sources and functions of various micronutrients.
- Write a note on soil cation exchange capacity and soil pH.