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KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR

THIRD YEAR SECOND SEMESTER
SUPLEMENTARY EXAMINATIONS

FOR THE DEGREE OF BACHELOR OF SCIENCE

COURSE CODE: SCH 351

COURSE TITLE: AQUATIC CHEMISTRY

DURATION: 2 HOURS

DATE: 1/02/21 **~~2020~~ TIME:** 2-4Pm

INSTRUCTIONS TO CANDIDATES

- Answer **QUESTION ONE** (Compulsory) and any other two (2) Questions.
- Indicate **answered questions** on the front cover.
- Start every question on a new page and make sure question's number is written on each page.

This paper consists of **3** printed pages. Please Turn Over

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Question 1

a) a) Define the following terms; [3mks]
   i. PH
   ii. Alkalinity
   iii. acidity

b) If a solution contains a concentration of H^+ as 8.6×10^{-9} moldm^{-3}, calculate the PH of the solution. **[3 marks]**

c) Explain what is meant by the term 'Turbidity' and state three Sources of excess Turbidity in Streams. [4mks]

d) Apart from turbidity, discuss any two other physical parameters used to measure the quality of drinking water. [4mks]

e) The Bungoma wastewater (pH = 7) has calcium ions (50 mg/L), magnesium (10 mg/L) ions, sodium (14.8 mg/L), bicarbonate ions (130 mg/L), 20 mg/L sulfate ions, and 100 mg/L carbonate ions. Calculate total alkalinity values. [5mks]

f) State four advantages of hard water. [4mks]

g) What is the aim of Coagulation? State any two coagulants. [3 Mks]

h) List four applications of alkalinity data of water. [4mks]

Question 2

a) a) Explain the importance of dissolved oxygen in water. [4mks]

b) A series of dilutions were prepared in 300 mL BOD bottles using settled raw sewage and unseeded dilution water. The dilution range, initial DO, final DO, and depletions are given in the Table below.

Bottle #	mL Seed	Initial DO	Final DO	Depletion
1	3	7.95	5.20	2.75
2	6	7.95	3.85	4.10
3	9	7.90	2.40	5.50
4	12	7.85	1.35	6.50

c) Determine the BOD of each seed dilution, and then calculate the average seed BOD. [10mks]

d) The BOD of a sewage incubated for one day at 30°C has been found to be 100 mg/L. determine the rate constant K at 30°c hence find the five day 20°C BOD. Assume K = 0.12 at 20°C, and $\theta = 1.056$ [6mks]

Question 3

a) State five domestic uses of water. [5mks]

b) Describe the specifications of water for domestic purposes. [5mks]

c) Explain clearly how suspended solids are removed in the treatment of water for drinking. [4mks]

d) Identify three chemicals added to the final stages of the treatment of water for drinking. State the purpose of adding each chemical identified. [6mks]

Question 4

a) State five differences between **point** and **non-point** sources of chemical inputs to receiving waters. [5mks]

b) Discuss five effects of water pollution on plants. [10mks]

c) List any **five ways** that help minimize water pollution. [5 Marks]

Question 5

a) Explain five unique physical properties of water. [5mks]

b) Explain how solar energy drives the water cycle. [2mks]

c) Explain the following terms;

I. The critical point (CP) [1mk]

II. The triple point (TP) [1mk]

d) Draw the phase diagram for water existing in three phases at equillibrium and on it label; triple point and critical point. **[4mks]**

e) State any three major sources of water. [3mks]

f) Explain how a water collection reservoir may affect the climate of the area. [4mks]