

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN
PUBLIC HEALTH**

PUHE 357: WATER SUPPLY AND QUALITY CONTROL

STREAMS: PUHE Y3S2

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 12/04/2023

11.30 A.M – 1.30 P.M

INSTRUCTIONS:

- 1. Do not write anything on the question paper.**
- 2. Mobile phones and any other reference materials are NOT allowed in the examination room.**
- 3. The paper has three sections. Answer ALL questions in Sections I, II and III.**
- 4. All your answers for Section I (MCQs) should be on one page.**
- 5. Number ALL your answers and indicate the order of appearance in the space provided in the cover page of the examination answer booklet.**
- 6. Write your answers legibly and use your time wisely**

SECTION 1: MULTIPLE CHOICE QUESTIONS [10 MARKS]

1. The following are some of the popular water coagulants, EXCEPT
 - [a]. Aluminium sulfate
 - [b]. Ferrous sulfate
 - [c]. Sodium aluminate
 - [d]. Calcium oxide
2. _____ is comprised of diseases where water acts as a passive vehicle for the infecting agent
 - [a]. Water-related vector-borne diseases
 - [b]. Water-washed disease
 - [c]. Waterborne disease
 - [d]. Water-based disease
3. In a conventional water treatment system, contact times for flocculation usually range from
 - [a]. 1 – 5 minutes
 - [b]. 5 – 30 minutes
 - [c]. 10 – 45 minutes
 - [d]. 15 – 60 minutes

4. Hardness represents the total concentration of calcium and magnesium ions, reported as
 - [a]. Magnesium carbonate
 - [b]. Calcium carbonate
 - [c]. Magnesium hydroxide
 - [d]. Calcium hydroxide

5. Blue baby syndrome is associated with consuming water contaminated with
 - [a]. Fluoride
 - [b]. Phosphorus
 - [c]. Lead
 - [d]. Nitrite

6. What is the maximum allowable concentration of Fluoride in potable water
 - [a]. 0.5 mg/L
 - [b]. 1.5 mg/L
 - [c]. 2.5 mg/L
 - [d]. 3.5 mg/L

7. To eliminate cercaria (snail larvae), water should be stored for at least
 - [a]. 12hours
 - [b]. 24hours
 - [c]. 32hours
 - [d]. 48hours

8. The depth of a ferrocement tank is usually
 - [a]. 1 – 1.5m.
 - [b]. 1.5 – 3m.
 - [c]. 3 – 4.5m.
 - [d]. 4.5 – 6m.

In question 9 and 10, indicate whether the statement is TRUE or FALSE.

9. The standards of potable water in Kenya (KEBS, 2015) require that *Escherichia coli* should not be present in 25mL of treated water [True/False]

10. Spring Water must not require disinfection at source [True/False]

SECTION II: SHORT ANSWER QUESTIONS [40 MARKS]

1. Define the following terms
 - [a]. Chemical Oxygen Demand [2 marks]
 - [b]. Water safety [2 marks]

2. State six (6) key characteristics of natural mineral waters [6 marks]
3. Outline ten (10) common constituents of water [5 marks]
4. Reinforced concrete reservoirs are one of the commonly used water facilities, that is generally used to store clean water for release on demand. Explain the general structure of a standard reinforced concrete water reservoir. [5 marks]
5. Water from potable sources or water turned potable by treatment remains susceptible to the introduction of contaminants at the household level during storage. Outline ten (10) key requirements for a safe household water storage system. [10 marks]
6. Water treatment by solar disinfection is one of the cost-effective and efficient way of water treatment that is rapidly gaining popularity in countries with access to adequate solar energy. Explain four (4) commonly used methods of solar water disinfection. [10 marks]

SECTION III: LONG ANSWER QUESTIONS [20 MARKS]

1. In the modern-day society, bottled water has gained widespread use particularly for people on transit and those in community and formal gatherings. Thus, to avert possible outbreaks or even increase in water-related diseases, there should be targeted public health efforts to ensure bottled water meet safety standards. This should be guided by a well-structured and pro-active water quality management system implemented right from the point of processing, packaging, up to the final point of consuming the bottled water. Discuss ten (10) key areas that should be incorporated in such bottled water quality management system [20 marks]
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