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QUALIFICATION : <b>BACHELOR OF ENVIRONMENTAL HEALTH SCIENCES</b>	
QUALIFICATION CODE: <b>08 BOHS</b>	LEVEL: <b>5</b>
COURSE: <b>WATER AND SANITATION</b>	COURSE CODE: <b>WAS512S</b>
DATE: <b>NOVEMBER 2024</b>	SESSION: <b>1</b>
DURATION: <b>3 HOURS</b>	MARKS: <b>100</b>

**FIRST OPPORTUNITY: QUESTION PAPER**

**EXAMINER: MRS. MOUYELELE HAUFIKU**

**MODERATOR: MS. CHARMAINE JANSEN**

**INSTRUCTIONS**

1. Answer all questions on the separate answer sheet.
2. Please write neatly and legibly.
3. Do not use the left-side margin of the exam paper. This must be allowed for the examiner.
4. No books, notes, and other additional aids are allowed.
5. Mark all answers clearly with their respective question numbers.

**PERMISSIBLE MATERIALS: NONE**

**This exam paper consists of 5 pages, including the front page.**

**SECTION A: SHORT ANSWER QUESTIONS****[30 MARKS]****QUESTION 1****[10 MARKS]**

1.0 Fill in the missing terms/concepts

1.1 \_\_\_\_\_ is that portion of rain water which has percolated into earth to forms underground deposit or water bearing soil formation called aquifers. [1]

1.2 \_\_\_\_\_ is that level in the earth's crust where all the voids in the soils and rocks are filled with water and from which water will flow freely. [1]

1.3 \_\_\_\_\_ is a measure of the amount of oxygen required to remove waste organic matter from water in the process of decomposition by aerobic bacteria (those bacteria that live only in an environment containing oxygen). [1]

1.4 \_\_\_\_\_ Is the process where water is heated to steam, which is then cooled and collected as liquid, leaving behind microorganisms and many other contaminants. [1]

1.5 \_\_\_\_\_ when water is passed through a membrane filter with very small pores under high pressure to remove minerals and contaminants, including all microorganisms. [1]

1.6 \_\_\_\_\_ is the most common route of transmission of gastrointestinal disease where the disease-causing organism is excreted in the faeces and faecal matter containing the causative organisms finds its way to the mouth or the same or another individual either, e.g. via contamination of the water or food by the faecal matter. [1]

1.7 \_\_\_\_\_ is a point where groundwater emerges at the surface of the ground), from where the water can be piped to consumers. [1]

1.8 \_\_\_\_\_ Can be described as excreta, water and other waste put down a drain. [1]

1.9 \_\_\_\_\_ simply means collecting, or harvesting, rainwater as it runs off from hard surfaces and storing it in a tank or cistern. [1]

1.10 \_\_\_\_\_ is also called clarification. [1]

**QUESTION 2****[10 MARKS]**

2.1 Classify the following diseases as water-borne, water-washed, water-based or water- related

2. 1.1 Dysentery [1]

2.1.2 Scabies [1]

2.1.3 Trachoma [1]

2.1.4 Dracunculiasis [1]

2.1.5 Yellow fever [1]

2.2 Interpret the following abbreviations in the context of water and sanitation

2.2.1 WASH [1]

2.2.2 CLTS [1]

2.2.3 Eco-San [1]

2.2.4 WHO [1]

2.2.5 BOD [1]

### QUESTION 3

[10 MARKS]

3.0 Choose the correct answer from the alternatives given. Write the question number and the correct letter representing your answer.

3.1 According to the World Health Organization (WHO) the required distance between the water source and the house should be within: [1]

- a) 1000 m of the house
- b) 1500 m of the house
- c) 200 m of the house
- d) 3000 m of the house

3.2 Water that is safe for drinking, free from pathogens which are introduced to the water through faeces, dirty containers is referred to: [1]

- a) Palatable water
- b) Potable water
- c) Raw water
- d) Colourless water

3.3 This hardness is due to the presence of carbonates of calcium and magnesium and can be removed by boiling. [1]

- a) Permanent hardness
- b) Acute hardness
- c) Reversible hardness
- d) Temporary hardness

3.4 All of the following are disadvantage of ground water, except: [1]

- a) Usually requires pumping for extraction
- b) Likely to be contaminated by dust and dirt
- c) May have a high level of bicarbonate, carbonate and chloride
- d) Poor in oxygen content

- 3.5 This bacteria will be one of the first bacteria that will be present in the water should contamination occur, and it will be in much larger quantities than others. [1]
- a) Coliform
  - b) Giardia lamblia
  - c) Cryptosporidium
  - d) Hepatitis A
- 3.6 The flagellated protozoa that are parasitic in the intestines of humans and animals. [1]
- a) Coliform
  - b) Giardia lamblia
  - c) Cryptosporidium
  - d) Hepatitis A
- 3.7 These spread by the transmission of oocysts via drinking water which has been contaminated with infected faecal material. [1]
- a) Coliform
  - b) Giardia lamblia
  - c) Cryptosporidium
  - d) Hepatitis A
- 3.8 These impurities are mainly inorganic and consist of mineral salts and metals such as calcium, magnesium, lead, iron and arsenic. [1]
- a) Screening
  - b) Grit removal
  - c) Dissolved
  - d) Sedimentation
- 3.9 This is a small body of water formed either by nature or man. [1]
- a) Pond
  - b) Aquifer
  - c) Rainwater
  - d) Groundwater
- 3.10 Schistosomiasis is a [1]
- a) Water borne disease
  - b) Water washed disease
  - c) Water-based disease
  - d) Water related disease



**SECTION B - C: LONG ANSWER QUESTIONS****[36 MARKS]**

Please answer ALL the questions in this section.

**QUESTION 4****[10 MARKS]**

- 4.1 Define the permanent hardness of water. [2]
- 4.2 Differentiate between the mineral salt impurities carbonates and sulfates in terms of pH influence, water hardness, health effects, and sources. [8]

**QUESTION 5****[26 MARKS]**

- 5.1 Outline the characteristics of a protected water source. [6]
- 5.2 State any five (5) advantages of a Ventilated Improved Pit (VIP) latrine. [5]
- 5.3 Explain why pit latrines are not suitable in areas where the groundwater table is high: [8]
- 5.4 Discuss how to sample water from a well. [7]

**SECTION C:****[34 Marks]**

Please answer ALL the questions in this section.

**QUESTION 6**

- 6.1 One of the main duties of a water supply provider is to ensure that a safe and plentiful water supply is available to all segments of a community at a reasonable cost. This may mean seeking new water sources to satisfy demand. Identifying potential new sources and assessing their viability prior to development is a skilled technical task that requires several different factors to be assessed. Briefly explain the factors to be considered before developing a water source. [14]
- 6.2 Cholera is an infectious disease that causes severe watery diarrhea, which can lead to dehydration and even death if untreated. Discuss the prevention & control measures for Cholera. [10]
- 6.3 Briefly explain any five (5) reasons why bottled water is not completely guaranteed to be free of all infectious microorganisms. [10]

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**END OF QUESTION PAPER**