

UNIVERSITY OF SWAZILAND

Faculty of Health Sciences



DEGREE IN ENVIRONMENTAL HEALTH

MAIN EXAMINATION PAPER DECEMBER 2018

TITLE OF PAPER : On site Sanitation

COURSE CODE : EHS 205

DURATION : 2 HOURS

MARKS : 100

INSTRUCTIONS :

- READ THE QUESTIONS & INSTRUCTIONS CAREFULLY**
- THERE ARE FIVE QUESTIONS, ANSWER FOUR QUESTIONS, QUESTION ONE IS COMPULSORY**
- EACH QUESTION CARRIES 25 MARKS**
- WRITE NEATLY & CLEARLY**
- NO PAPER SHOULD BE BROUGHT INTO THE EXAMINATION ROOM**

: BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER

DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED BY THE INVIGILATOR.

QUESTION ONE

1. The best human waste disposal method in an area where the water table is high is:
 - a. Pit latrines
 - b. Ventilated pit latrines
 - c. Ecosan latrine
 - d. Septic tanks [1]

2. Water polluted by various human activities causes a number of water borne diseases. Which of the following is not a water borne disease?
 - a. Cholera
 - b. Typhoid
 - c. Asthma
 - d. Dysentery [1]

3. Human excreta related diseases include:
 - a. Malaria and dysentery.
 - b. Schistosomiasis and Malaria.
 - c. Trachoma and typhoid.
 - d. Cholera and amoebiasis. [1]

4. Which of the following are methods of excreta disposal?
 - a. Crude dumping controlled tipping, trench latrines.
 - b. Trench latrines, pit latrines, controlled tipping.
 - c. Pit latrines, bucket latrines, septic tank.
 - d. Crude dumping, controlled tipping, composting [1]

5. The vector that do not directly relate to human waste are:
 - a. Flies.
 - b. Snails.

- c. Mosquitoes.
d. Liver flukes. [1]
6. The way in which the vector may transmit pathogens by carrying the infective pathogen on its body or limbs is referred to as:
a. Biological transmission.
b. Contamination.
c. Mechanical transmission.
d. Ingestion. [1]
7. Diseases like Cholera can be transmitted through the following route of transmission:
a. Air born.
b. Faecal oral.
c. Hand to mouth.
d. Trans-dermal. [1]
8. The decomposition of faecal matter is mainly carried out by;
(a) Bacteria
(b) Fungi
(c) Viruses
(d) Worms [1]
9. During composting of a mixture of faecal matter and vegetable waste under fully aerobic conditions, the temperature may rise to;
(a) 50°C
(b) 60°C
(c) 70°C
(d) 80°C [1]

10. Soil porosity also affects the rate of infiltration liquids from pits and drainage trenches. Soils known to drain easily include;
- (a) Gravel
 - (b) Silt
 - (c) Clay
 - (d) Soils containing organic matter
- [1]
11. Many insects are attracted to excreta because it provides rich organic material and water, both of which are essential for the insects' development. The most important groups of insects, from a health point of view, do not include;
- (a) Culex mosquitos
 - (b) Dragon flies
 - (c) Anopheles mosquitoes
 - (d) Blowflies
- [1]
12. When building latrines, the shape of the pit may be circular, square or rectangular in plan. However, the most stable type of a pit is the one that is;
- (a) Square
 - (b) Circular
 - (c) Rectangular
 - (d) Square (especially in granular soils)
- [1]
13. When they are operated as recommended, they can be considered as permanent installations. These are;
- (a) Double-pit VIP latrines
 - (b) Very dip simple latrines
 - (c) VIP latrines
 - (d) Very dip simple latrines lined with hard rock
- [1]

14. There are five categories of ground conditions that affect selection and design of sanitation facilities which must always be considered. These include;

- (a) bearing capacity of the soil
- (b) self-supporting properties of the pits against collapse,
- (c) depth of excavation possible,
- (d) infiltration rate, and
- (e) Ground water pollution risk.

For each of the following statements, state the most relevant ground condition mentioned above.

- (a) In general, it is safe to assume that if the ground is suitable for building a house it will also be strong enough to support the weight of a latrine superstructure made of similar materials, providing the pit is appropriately lined.
- (b) Soils containing organic materials also tend to retain water but the roots of plants and trees break up the soil, producing holes through which liquids can drain quickly.
- (c) Growth of microorganisms and their wastes, swelling of clay minerals, and precipitation of insoluble salts are some of the things that are a problem in this factor
- (d) Because of their comparatively large size, protozoa and helminths are rapidly removed by the straining action of the soil, but bacteria and viruses are more persistent
- (e) Of the chemical substances generally present in domestic wastes, only nitrates present serious health dangers. Young babies bottle-fed with milk made from water with a high nitrate concentration may develop methaemoglobinaemia, which can be fatal if untreated.
- (f) In the unsaturated zone, the flow of liquid is induced by gravity and cohesive and adhesive forces set up in the soil. Seasonal variation may

produce a change in the amount of air and water in the soil pores and this will affect the flow rate. [6]

15. State any five examples of improved sanitation facilities [5]

16. The most expensive on-site sanitation systems are;

- (a) VIP latrines
- (b) Pour-flush latrines
- (c) Septic tanks
- (d) Ecological latrines [1]

QUESTION TWO

1. Explain five points you will consider in planning a communities organization for communal construction of sanitary accommodation for human excreta disposal in rural areas and small communities in Swaziland or Zimbabwe. [15 marks]
2. What are five values of using participatory approaches in rural excreta disposal systems? [10 marks]

QUESTION THREE

1. In the five transmission routes of a pathogen from excreta to susceptible host, explain preventive measures. (10 marks)
2. Describe the **constructional details** and **operation** of a ventilated improved pit latrine. (15 marks)

QUESTION FOUR

1. What are five effects of indiscriminate excreta disposal [5 marks]
2. Fully describe the scope of public health by mentioning ten (10) of its components. (20 Marks)

QUESTION FIVE

1. You are in charge of an area with a population of about 5 000 where their houses are plumbed with piped water supply but no sewerage services. With a sketch diagram describe the method of excreta disposal you will recommend to the residents. (13 Marks)
2. Mention three advantages and three disadvantages of the method you have recommended in (a) above. (12 Marks)