



**UNIVERSITY OF SWAZILAND
FACULTY OF HEALTH SCIENCES
DEPARTMENT OF ENVIRONMENTAL HEALTH
SCIENCE**

FINAL EXAMINATION PAPER: DECEMBER 2017

TITLE OF PAPER	ON-SITE SANITATION
COURSE CODE	EHS 205
DURATION	2 HOURS
TOTAL NUMBER OF MARKS	100
INSTRUCTIONS	<ol style="list-style-type: none">1. DO NOT OPEN THIS PAPER UNTIL YOU ARE INSTRUCTED TO DO SO BY THE INVIGILATOR.2. QUESTION ONE IS COMPULSORY. CHOOSE THREE OTHER QUESTIONS IN ADDITION TO QUESTION ONE.3. BEGIN YOUR ANSWERS TO EACH QUESTION ON A FRESH PAGE OF THE ANSWER BOOKLET. ALL PAGES MUST BE NUMBERED CORRECTLY.4. UNCLEAR HANDWRITING AND CARELESSNESS IN ENGLISH LANGUAGE GRAMMAR SHALL RESULT IN LOSS OF MARKS.5. MISCONDUCT DURING THE COURSE OF THE EXAMINATION IS PUNISHABLE IN LINE WITH REGULATIONS 012.45-012.48.

QUESTION ONE [25 MARKS]

The results of a recently concluded survey of the occurrence and prevalence of water and sanitation diseases/pathogens, in one rural community, are shown in **Fig. 1**. Study the diagram carefully and answer the questions that follow.

Note:

Type 1: Viruses (hepatitis A and hepatitis E), parasites (e.g., giardia, cryptosporidium), and bacteria (e.g., *Shigella*, *Campylobacter jejuni*, *Escherichia coli*, *Salmonella spp.*, and *Vibrio cholerae*).

Type 2: Schistosomiasis and dracunculiasis

Type 3: Shigellosis, trachoma and scabies

Type 4: Dengue fever, malaria, and trypanosomiasis, onchocerciasis

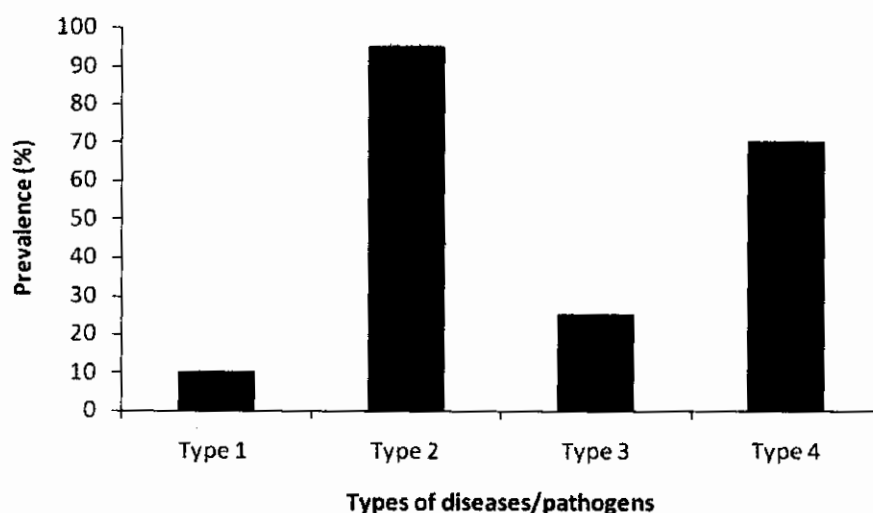


Figure 1: Prevalence of water and sanitation diseases/pathogens in one rural community in Swaziland

- Generally, this community does not have a problem with diarrhoeal diseases. This is according to;
 - Type 2
 - Type 3
 - Type 1
 - Type 4
- Generally, this community does not have a problem with potable water supply. This is according to;
 - Type 2
 - Type 3
 - Type 4
 - Type 1

3. Amongst the many disease vectors known to science, the environmental conditions in this community are favourable to the survival of snails. This is according to;
 - (a) Type 1
 - (b) Type 3
 - (c) Type 2
 - (d) Type 4
4. While there is generally good access to water supply, personal hygiene standards are still generally low. This is according to;
 - (a) Type 1 and 2
 - (b) Type 2 and 3
 - (c) Type 3 and 4
 - (d) Type 1 and 3
5. Generally, there seems to be a lot of open water sources that support the breeding and prevalence of insects such as tsetse flies and mosquitoes. This is according to;
 - (a) Type 1
 - (b) Type 4
 - (c) Type 2
 - (d) Type 3
6. You would not be surprised to find that even though there is access to potable water supply, a large percentage of the population is often involved in activities that require contact with natural water sources such as slow-moving rivers and dams. This is according to;
 - (a) Type 3 and 4
 - (b) Type 2 and 4
 - (c) Type 1 and 2
 - (d) Type 2 and 3
7. There is generally low contact between faecal matter and potable water in this community. This is according to;
 - (a) Type 2
 - (b) Type 1
 - (c) Type 3
 - (d) Type 4
8. Amongst the five leisure activities in the community, namely; swimming, soccer, netball, athletics, and boxing, the most important seems to be swimming. This is according to;
 - (a) Type 1
 - (b) Type 3
 - (c) Type 2
 - (d) Type 4
9. The squat hole must be left open to allow the free passage of air. This is only relevant in;
 - (a) Ventilated improved pit latrines
 - (b) Simple pit latrines
 - (c) Aqua privies
 - (d) Composting toilets

10. The pour-flush latrine can be designed in;
 - (a) Three different ways
 - (b) Two different ways
 - (c) Four different ways
 - (d) Five different ways
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) Anopheles mosquitos
 - (b) Dragon flies
 - (c) Blowflies
 - (d) Cockroaches
12. Keeping excreta in a dark place does not prevent the breeding of;
 - (a) Houseflies
 - (b) Anopheles mosquitos
 - (c) Dragon flies
 - (d) Blowflies
13. For finding food, sight and smell are important in
 - (a) Anopheles mosquitos
 - (b) Viruses
 - (c) Flies
 - (d) Pathogens
14. Keeping the pit of a latrine fully sealed or covering the surface of the liquid with a film, such as oil, is important in minimizing the breeding of;
 - (a) Dragonflies
 - (b) Blowflies
 - (c) Culex mosquitos
 - (d) Cockroaches
15. The Sustainable Development Goals (SDGs) came into effect on;
 - (a) 1 January 2014
 - (b) 1 January 2015
 - (c) 1 January 2017
 - (d) 1 January 2016
16. Solid, moist and fermenting material is most suitable for the breeding of;
 - (a) Rodents
 - (b) Anopheles species
 - (c) Culex species
 - (d) Houseflies
17. Its larval stage prefers faecal matter that is more liquid in nature. This is;
 - (a) A blowfly
 - (b) A housefly
 - (c) A dragonfly
 - (d) A horsefly

18. Moisture and organic matter in latrines are key factors in the attraction of;
 - (a) Rodents
 - (b) Cockroaches
 - (c) Houseflies
 - (d) Blowflies
19. The most expensive on-site sanitation systems are;
 - (a) VIP latrines
 - (b) Pour-flush latrines
 - (c) Septic tanks
 - (d) Ecological latrines
20. In a septic tank, the maximum rate of digestion can be achieved at about;
 - (a) 25 °C
 - (b) 40 °C
 - (c) 45 °C
 - (d) 35 °C
21. The United Nations 2030 agenda for sustainable development consists of;
 - (a) 15 SDGs
 - (b) 16 SDGs
 - (c) 18 SDGs
 - (d) 17 SDGs
22. The United Nations Sustainable Development Goals consist of;
 - (a) 149 targets
 - (b) 159 targets
 - (c) 169 targets
 - (d) 179 targets
23. The period over which the SDGs and targets are to be implemented is;
 - (a) 10 years
 - (b) 15 years
 - (c) 20 years
 - (d) 25 years
24. The formulation of SDGs and targets was a results of;
 - (a) 2 years of intensive public consultation and engagement
 - (b) 8 years of intensive public consultation and engagement
 - (c) 6 years of intensive public consultation and engagement
 - (d) 4 years of intensive public consultation and engagement
25. The formation of a layer of scum on the water surface in latrines is important in the prevention of;
 - (a) Blowflies
 - (b) Anopheles species
 - (c) Rodents
 - (d) *Musca domestica*

QUESTION TWO [25 MARKS]

1. The targets of SDGs, which address sanitation, are far more ambitious than the previous targets of the Millennium Development Goals (MDGs). Briefly outline the ways in which the SDGs targets differ from the MDG targets [8].
2. The WHO and UNICEF Joint Monitoring Programme (JMP) for water, sanitation and hygiene categorizes sanitation services into; *safely managed, basic, limited, unimproved, and open defecation*. In not more than two sentences, describe each of these categories [8].
3. What are improved sanitation facilities? [2]
4. State any four examples of improved sanitation facilities [4].
5. State any three examples of unimproved sanitation facilities [3].

QUESTION THREE [25 MARKS]

1. Three key characteristics of excreted pathogens strongly affect transmission. State and (with the aid of examples) describe these three characteristics [9].
2. State one type of latrine that is associated with the term “nightsoil” [2].
3. Some pathogens are *immediately infectious on emerging from the host in faecal matter*, while others *have a latent period lasting from a few hours to several weeks before they are infectious*. Of these two broad types, which ones are more likely to present bigger problems and in what way? [2]
4. State any five constraints that hinder the improvement of health through better sanitation [5].
5. In the study of the different types of on-site sanitation facilities, what do you understand by the term “cat method”? [3]
6. Describe some of the health risks associated with the cat method you have described above [2].
7. Describe any two purposes of a vent pipe [2].

QUESTION FOUR [25 MARKS]

1. Lack of sanitation facilities in any given community is always a behaviour burden to women than it is for men. What does this statement mean? [5].
2. When it comes to developing sanitation infrastructures, particular cultural dynamics tend to be ignored, although they turn out to be highly relevant for the acceptance and ways of use by households. Describe some of the cultural prescriptions that need to be considered when providing sanitation facilities for Muslim families in some African cultures [5].
3. In some places in Africa, cultural beliefs can prevent the effective use of the available sanitary facilities. Describe some of these beliefs [5].
4. Describe the key challenges associated with borehole latrines [5].
5. The use of local material in building latrines is important. However, the use of timber, bamboo or hard woods is generally not recommended. Why? [5]

QUESTION FIVE [25 MARKS]

The following statements refer to the many on-site sanitation facilities, which you have studied during the course of the semester. In each case, state the most relevant type/types of on-site sanitation facility/facilities.

1. State any four types of sanitation facilities that cannot function without the availability of water [4].
2. State one type of sanitation facility that can be located inside a house [2].
3. State one sanitation facility that is suitable for individual households, schools, hospitals and small housing estates [2].
4. State one sanitation facility that is known to be more expensive than most of on-site sanitation facilities [2].
5. State one sanitation facility that is able to control the problem of flies, bad odours and mosquitoes [2].
6. State one sanitation facility that cannot function well without a water seal [2].
7. State one sanitation facility that requires the use of dry soil, wood ash, saw dust, grass cuttings, vegetable waste, etc [2].
8. State one sanitation facility that is suitable for areas that have difficult ground conditions, which impede excavation [2].
9. State one sanitation facility that is known to combat the problem of flies and bad odours, but not mosquitoes [2].
10. State any four sanitation facilities that do not require the use of water [4].
11. State one sanitation facility that can be excavated either by hand with an auger or by machine [1].