



UNIVERSITY OF SWAZILAND
Faculty of Health Sciences
Department of Environmental Health Science

DEGREE IN ENVIRONMENTAL HEALTH SCIENCE
DEGREE IN BACHELOR OF COMMUNITY HEALTH NURSING

RE-SIT EXAMINATION PAPER JULY 2018

TITLE OF PAPER : INTRODUCTION TO PARASITOLOGY

COURSE CODE : EHS 107

DURATION : 2 HOURS

MARKS : 100

INSTRUCTIONS :

READ THE QUESTIONS & INSTRUCTIONS CAREFULLY

: QUESTION ONE IS COMPULSORY, THEN ANSWER ANY OTHER THREE QUESTIONS

: 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 1

- a. **MULTIPLE CHOICE:** Write down the letter corresponding to your chosen answer among the options provided for each questions.
- i. Which of the recognized groups of protozoans lack typical organelles for movement?
- A. Sarcodinians
 - B. Apicomplexans
 - C. Ciliates
 - D. Amoebas
 - E. Flagellates
- ii. The infective stage that results in *Taenia solium* adult worm infection in humans is
- A. the egg
 - B. the adult worms
 - C. *Cysticercus cellulosae*
 - D. *Cysticercus bovis*
 - E. *Echinococcus granulossus*
- iii. During the life cycle of *Diphylobothrium latum*, the coracidium enters the body of a crustacean and turns into a larva.
- A. proceroid
 - B. plerocercoid
 - C. rhabditiform
 - D. filariform
 - E. metacercaria
- iv. The following parasite stages are identified from the blood of an infected man. The parasite shown below is likely to be



- A. *Plasmodium malariae*
 - B. *Plasmodium vivax*
 - C. *Plasmodium ovale*
 - D. *Plasmodium knowlesi*
 - E. *Plasmodium falciparum*
- v. What is the reservoir for *Balantidium coli*?
- A. The human gastrointestinal tract
 - B. Soil
 - C. Rodents
 - D. The large intestines of pigs
 - E. Water

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- vi. In malaria, the form of the parasite transmitted from the mosquito to man is the:
- gametocyte
 - sporozoite
 - merozoite
 - hypnozoites
 - trophozoites
- vii. Each of the following statements concerning malaria is correct except:
- The female *Anopheles* mosquito is the causative agent for malaria
 - Early infection sporozoites enter and multiply inside hepatocytes
 - Release of merozoites from red blood cells is the cause for the fever and chills associated with malaria
 - The principal site of gametocyte formation is the bloodstream of man
 - Malaria antibodies are lost in the body of the host following increased periods of non-exposure
- viii. Which of the following water treatment changes would be appropriate following confirmation of *Cryptosporidium parvum* outbreak in a community?
- Add more chlorine to the water supplies
 - Begin filtering water supplies
 - Begin boiling water supplies
 - Begin subjecting water supplies to ethylene oxide
 - Begin protecting water supplies from terrorists
- ix. Pigs or dogs are the source of human infection by each of the following parasites except:
- Echinococcus granulosus*
 - Taenia solium*
 - Ascaris lumbricoides*
 - Trichinella spiralis*
 - None of the above
- x. Each of the following statements concerning hookworm infection is correct except:
- Hookworm infection can cause pneumonia
 - Hookworm infection is acquired by humans when filariform larvae penetrate the skin
 - Hookworm infection may result in severe anaemia
 - Hookworm infection may be confirmed by finding trophozoites in the stool
 - Hookworm infections are common in areas with sandy, humus containing soil
- b. **TRUE OR FALSE:** Write **T** (for True) or **F** (for False) against each of the statements below:
- Facultative protozoan parasites live and multiply in bodies of the host, in water and in the soil.
 - Most protozoan parasites result in high levels of morbidity and mortality in patients with impaired cell-mediated immunity such as those infected with HIV.

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- iii. Diagnostic methods that identify specific DNA molecules of parasites are more sensitive than microscopy for the confirmation of infection with parasitic diseases.
- iv. Metacyclic trypomastigotes are only found in the salivary glands of an infected tsetsefly vector.
- v. Cysts of *Giardia lamblia* have four nuclei when passed out in faeces

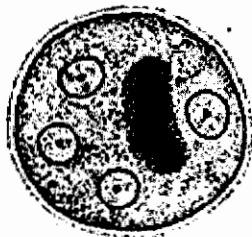
QUESTION 2

- a. Balantidiasis is said to be a zoonotic commensal of the human digestive tract.
 - i. Explain why balantidiasis is said to be a zoonotic infection. (2)
 - ii. Why is the disease said to be a commensal? (2)
 - iii. During clinical diagnosis how would you use symptoms to differentiate between balantidiasis and amoebiasis. (4)
 - iv. How can you differentiate balantidiasis symptoms from those resulting during giardiasis infection. (2)
 - v. During laboratory diagnosis, what features would you use to differentiate *Balantidium coli* from *Giardia lamblia*? (4)
- b.
 - i. What is the infective stage of African trypanosomiasis? (1)
 - ii. Name the two parasites responsible for African trypanosomiasis. (2)
 - iii. Name the genus of the vector responsible for transmission of African trypanosomiasis in man. (1)
 - iv. What drug is commonly used to treat a patient who is already in the third stage (sleeping sickness) of trypanosomiasis? (1)
 - v. Besides vector transmission, how can African trypanosomiasis be transmitted from an infected person to another. Mention two ways. (2)
 - vi. Describe TWO methods you may use to reduce incidence of African trypanosomiasis in a community. (4)

[25 marks]

QUESTION 3

- a. A 12-year old girl reports to your clinic with fulminating dysentery, acute diarrhoea and vomiting. Upon further examination of the stool, it was found to contain bloody mucus and that the girl had significantly lost weight. The laboratory identifies the parasite shown below from the stool of the girl.



- i. Give the name and stage of the parasite shown above. (2)
- ii. What features did you use to identify this parasitic species? (2)

- iii. Do you think this parasite is responsible for the symptoms? Explain. (3)
- iv. As a healthcare worker, what suspicion does the identification of this parasite confirm? (4)
- v. Discuss any further tests and management process that you are likely to conduct on the patient prior to treatment. (6)
- vi. Discuss THREE major community measures that you would initiate to prevent similar infections among children in the community? (6)
- b. The health worker attending to the girl in (a) suspected giardiasis at first. What symptoms may have led to the health worker discarding this suspicion? (2)

[25 marks]

QUESTION 4

- a. The diagnosis of malaria has undergone advancement and improvement in the last decade with the development and introduction of rapid diagnostic tests (RDTs) alongside introduction artemisinin combination therapies (ACTs) for treatment of malaria.
 - i. What improvements have been added by RDTs into microscopic diagnostic procedures for malaria? (4)
 - ii. Discuss briefly the basic method of function and operation of RDTs. (4)
 - iii. Name the ACT recommended for use alongside RDTs in Swaziland's malaria treatment policy. (1)
 - iv. Why has the treatment policy in Swaziland switched from chloroquine to the ACT mentioned in (iii) above? (2)
- b. Malaria control has also resulted in vast reduction reductions in the last decade following the introduction of insecticide treated nets (ITNs) and recently of long lasting insecticide treated bednets (LLINs).
 - i. What characteristics of ITNs have been exploited to facilitate reduction of disease incidence among endemic populations? (4)
 - ii. Recent development on LLINs have reported the inclusion of the chemical piperonyl butoxide during the manufacture of the nets. What advantages has the addition of piperonyl butoxide brought in the ability of the LLINs to reduce malaria incidence? (3)
- c. Efforts to reduce reliance on pesticide use to reduce malaria incidence in some countries such as Benin in West Africa have introduced large-scale production of the malaria biocontrol agent *Romanomermis iyengari*.
 - i. What advantages do biocontrol methods have over wide-scale insecticide use? (4)
 - ii. Describe the method of function of *R. iyengari* in the reduction of malaria incidence among endemic populations. (3)

[25 marks]

QUESTION 5

A twenty-six year old woman complains of remittent diarrhoea that ranges from mild to profuse diarrhoea, accompanied by abdominal cramps, anorexia, nausea and vomiting. She claims the symptoms had lasted for more than a month and in the process to have lost a considerable amount of weight. The doctor orders an HIV test and she is confirmed to be positive and with a low CD4 cell count.

- a. Name two protozoan parasites of the digestive tract the woman is likely to be infected with. (2)
- b. Explain how the infecting species may be confirmed in the laboratory. (3)
- c. Describe ONE major difference in the multiplication of the two parasites mentioned in (a) above. (3)
- d. Explain the cause of the diarrhoea associated with the parasites mentioned in (a) above. (3)
- e. The doctor makes an endoscopic examination of the intestinal mucosa of the woman.
 - i. Write down two possible findings the doctor may make following endoscopic examination of the intestinal mucosa. (2)
 - ii. What effect does the low CD4 cell count on the symptoms of the diseases? (2)
 - iii. Name one drug associated with each possible diagnosis the doctor is likely to prescribe following confirmation of the infecting species of parasite. (2)
- f. Explain FOUR (4) pieces of advice the doctor is likely to recommend to the HIV-positive woman in order to prevent bouts of diarrhoea due to the same parasites in future. (8)

[25 marks]

QUESTION 6

- a. Hookworm infections are more common in the Lowveld of Swaziland than in the Highveld. What circumstances are responsible for this difference? (2)
- b. Explain how a laboratory technologist may differentiate the following parasites using structural characteristics:
 - i. *Ancylostoma duodenale* and *Necator americanus* adult worms (2)
 - ii. Rhabditiform larva of Hookworm from that of *Strongyloides stercoralis* (2)
- c. Describe TWO ways humans may acquire infection with hookworm parasites. (4)
- d. Hookworm symptoms involve pulmonary stage symptoms and anaemia. Describe the symptoms associated with pulmonary involvement and explain the cause of pulmonary symptoms and anaemia.
 - i. Pulmonary symptoms (4)
 - ii. Anaemia (4)
- e. Name one drug commonly used to successfully treat hookworm infections in humans. (1)
- f. Describe THREE methods you would recommend to a community for prevention of human infections. (6)

[25 marks]