

UNIVERSITY OF SWAZILAND

FACULTY OF HEALTH SCIENCES

RE-SIT EXAMINATION PAPER – JULY, 2019

TITLE OF PAPER : INTRODUCTION TO PARASITOLOGY

COURSE CODE : EHS126

TIME : 2 HOURS

MARKS : 100

INSTRUCTIONS :

- ANSWER QUESTION 1 AND ANY THREE OTHER QUESTIONS**
- EACH QUESTION CARRIES 25 MARKS**
- NO FORM OF PAPER SHOULD BE BROUGHT INTO NOR TAKEN OUT OF THE EXAMINATION ROOM**
- BEGIN THE ANSWER TO EACH QUESTION ON A SEPARATE SHEET OF PAPER**
- CALCULATORS MAY BE USED BUT THEY MUST BE THE SILENT TYPE**
- ALL CALCULATIONS/WORK-OUT DETAILS SHOULD BE SUBMITTED WITH YOUR ANSWER SHEET**

DO NOT OPEN THE QUESTION PAPER UNTIL PERMISSION TO DO SO IS GRANTED BY THE INVIGILATOR

QUESTION 1 (Compulsory – All students MUST answer this question)

- a. Write down the letter corresponding to your chosen answer to illustrate your response to each of the items in this question. (20)
- i. Which one of the following symptoms is not essentially in suspecting giardiasis among infected patients?
 - A. Sudden onset of acute, severe diarrhoea
 - B. Absence of blood and mucous in stool
 - C. Chronic intermittent diarrhoea
 - D. Severe upper abdominal cramps, nausea and vomiting
 - E. Increased foul flatus, fatigue and weight loss

 - ii. Which one of the following is commonly not a route of infection of humans with worm parasites?
 - A. Ingestion of eggs in contaminated water, food or hands
 - B. Ingestion of larvae in infested food material
 - C. Ingestion of cysts in contaminated water, food or hands
 - D. Penetration of exposed skin by mature larval stages of parasites
 - E. None of the above

 - iii. Which of the following characteristics IS NOT useful in differentiating Platyhelminthes (flatworms) from Nematelminthes (roundworms)?
 - A. Platyhelminthes have dorso-ventrally flattened bodies while Nematelminthes have cylindrical bodies
 - B. Platyhelminthes have segmented bodies while Nematelminthes have unsegmented bodies
 - C. Platyhelminthes possess no body cavity while Nematelminthes have a body cavity
 - D. Platyhelminthes may or may not possess a gut or alimentary canal while Nematelminthes always possess an alimentary canal
 - E. Both B and D

 - iv. Blood flukes differ from other trematodes with regard to one of the characteristics below. Which one is it?
 - A. Blood flukes have cylindrical bodies while other trematodes have dorso-ventrally flattened bodies
 - B. Blood flukes are dioecious while other trematodes are hermaphroditic
 - C. Trematodes encyst as metacercariae stages on plant or animal hosts while blood flukes never form the metacercariae stage
 - D. The stage of blood flukes that infects humans is the cercaria while the metacercaria is the infective stage of other trematodes
 - E. Blood flukes infect and remain to multiply inside blood vessels while other trematodes multiply in tissues

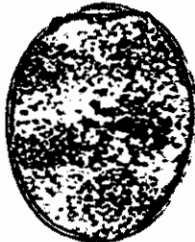
- v. The incubation period for *Plasmodium falciparum* is:
- A. 48 hours
 - B. 24 – 36 hours
 - C. 24 days
 - D. 12 days
 - E. 12 - 24 hours
- vi. Which one of the following stages of development of the malaria parasites DOES NOT occur in the mosquito?
- A. sporozoite
 - B. gametocyte
 - C. merozoite
 - D. oocyst
 - E. ookinete

- vii. The parasite shown below was identified.



The parasite is likely to have been recovered from:

- A. freshly passed faeces of a cat infected with *Toxoplasma gondii*
 - B. freshly passed faeces of a man infected with *Isosporabeli*
 - C. freshly passed faeces of a man infected with *Toxoplasma gondii*
 - D. faeces of man infected with *Toxoplasma gondii* after 3 or more days
 - E. freshly passed faeces of a man infected with *Cryptosporidium parvum*
- viii. The egg shown below was recovered from the lung tissues of a man that showed up to a health facility with blood in sputum.



The diagnosing health worker is likely to conclude that the man is suffering from:

- A. schistosomiasis
- B. fascioliasis
- C. fasciolopsiasis
- D. paragonimiasis
- E. clonorchiasis

- ix. Which of the following diseases would result in reduced transmission from consistent and adequate washing of vegetables and fruits before consumption?
- Toxoplasmosis only
 - Isosporiasis, cryptosporidiosis and toxoplasmosis
 - Malaria
 - Isosporiasis, cryptosporidiosis, toxoplasmosis and malaria
 - Isosporiasis and cryptosporidiosis only
- x. The Rapid Diagnostic Test strip below is obtained from a patient with fever.



The attending healthcare official is likely to conclude that the:

- test is inconclusive
 - patient is not infected
 - patient is infected
 - patient is infected with two malaria species
 - was infected but successfully treated
- b. To indicate your response to the items in this question chose and write down the parasite described in each statement among those provided below: (5)

Giardia lamblia, *Entamoebahistolytica*, *Trypanosoma rhodesiense*, *Plasmodium vivax*,
Ancylostomaduodenale, *Cryptosporidium parvum*, *Enterobiusvermicularis*, *Balantidium coli*.

- The largest protozoan parasite of the gastro-intestinal tract
- A protozoan parasite often found with ingested red blood cells
- A parasite often associated with peri-anal pruritus among infected children
- An intracellular parasite of the red blood cells of humans
- A protozoan parasite that often results in internal autoinfection of immunocompromised adults

QUESTION 2

- a. *Balantidium colicauses* dysentery and intestinal ulcers in infected human hosts.
- Explain how the symptoms of balantidiasis may be excluded from amoebiasis which also results in dysentery. (2)
 - Explain how the ulcers caused by *Balantidium coli* are differentiated from those caused by *Entamoeba histolytica*. (2)
 - Explain why ulcers caused by *Balantidium coli* are often localised in the intestinal lumen and are rarely found in extra-intestinal tissues. (2)
 - Discuss THREE initiatives you may introduce in a community to reduce incidence of balantidiasis. (6)
- b. The number of patients diagnosed with isosporiasis, cryptosporidiosis and toxoplasmosis has significantly increased globally in the last two decades of the 21st century.
- Explain the cause for the increase. (3)

- ii. List TWO similarities in the life cycles of isosporiasis, cryptosporidiosis and toxoplasmosis. (2)
- iii. Why is *Toxoplasma gondii* sometimes NOT classified in the same class (Coccidia) as *Isospora belli* and *Cryptosporidium parvum*? (2)
- c. Discuss THREE pieces of advice you are likely to give to a patient who is found to show symptoms of cryptosporidiosis. (6)

[25 marks]

QUESTION 3

- a. Write down the names of the larval stages that hatch from eggs of the following tapeworms:
- Taenia solium* (1)
 - Taenia saginata* (1)
 - Diphyllobothrium latum* (1)
- b. What structural characteristics would use to differentiate between:
- A scolex of *Taenia solium* and that of *Taenia saginata* (2)
 - A proglottid of *Taenia solium* from that of *Taenia saginata* (2)
 - A scolex of *Taenia solium* from that of *Diphyllobothrium latum* (2)
- c. Larval stages of some tapeworms may be carried through the bloodstream of man often reaching the brain and causing neurologic complications.
- Which of the tapeworms above often lead to larval infections in humans? (1)
 - Explain how man acquire infection with the larvae of the parasite mentioned in d(i) above? (3)
- d. What is the common route of infection of man by adult tapeworms? (2)
- e. Describe the processes involved during the laboratory confirmation of human infections with the three tapeworms mentioned in a (i) above. (4)
- f. Describe THREE strategies you would recommend to reduce infections with adult *T. solium*, *T. saginata* and *D. latum*. (6)

[25 marks]

QUESTION 4

- a. Malaria has been reported to cause devastating effects among certain groups of the society. Explain why the following groups suffer severe effects of malaria following infection:
- Pregnant women (6)
 - Children (4)
 - Non-immune travellers (3)
- b. Prior to the development of rapid diagnostic tests (RDTs) that have high sensitivity and specificity for malaria, many resource limited centres relied on clinical diagnosis to inform treatment decisions of patients. What problems are associated with prescribing drugs based on malaria symptoms only? (4)
- c. To confirm malaria diagnosis, RDTs and microscopy are employed together in some facilities. What are the advantages of conducting microscopy following an RDT positive test? (5)
- d. Describe THREE environmental strategies that you would implement at community level to sustain reduced malaria incidence? (3)

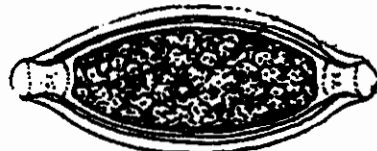
[25 marks]

QUESTION 5

- a. The worm shown below was recovered following aspiration caecum of an eight year-old girl who had perianal and perineal haemorrhages and frequently fell asleep in class.



- i. Name the parasite. (1)
 - ii. What caused the perianal and perineal pruritus? (3)
 - iii. Why did the girl frequently fall asleep in class? (2)
 - iv. Describe two ways the girl could have acquired infection with this parasite? (4)
 - v. Name one drug you would recommend for successful treatment of the girl. (1)
 - vi. Discuss THREE pieces of advice you would give to the parents of the girl to prevent future infection with this parasite. (6)
- b. Mr Hamilton from Toronto (Canada) visits the Coast of KwaZulu-Natal and spends three days at a small coastal town. After returning to Toronto, he develops mild diarrhoea and consults his personal physician to establish the cause. The physician's laboratory identifies the following eggs from his stool and counts the number of eggs per gram of faeces.



- i. Name the parasite Mr Hamilton is infected with. (1)
- ii. Suggest one method Mr Hamilton probably acquired infection with this parasite. (2)
- iii. Why were the eggs counted? (1)
- iv. Suppose after counting the eggs, the physician's laboratory finds that the number of eggs per gram of faeces is very few and decide not to give Mr Hamilton any specific treatment except for Oral Rehydration Therapy. Why do you think it was not necessary to give Mr Hamilton an anti-helminthic drug such as mebendazole? (4)

[25 marks]

QUESTION 6

- a. Flukes are often referred to as Digenean parasites.
- Explain why flukes are referred to as Digenean parasites. (2)
 - Which flukes are not Digenean parasites and why? (3)
 - Name ONE second intermediate host in which the following flukes are likely to encyst. (3)

Fluke	Intermediate host
<i>Paragonimus westermanni</i>	
<i>Fasciolopsis buski</i>	
<i>Fasciola hepatica</i>	

- b. The parasites shown below are recovered from the stool of a patient with acute diarrhoea and fulminating dysentery.



- Write down the scientific names and stages shown in A and B. (4)
- Is any of these stages responsible for the symptoms reported by the patient? Explain your answer. (3)
- Write down two pieces of information that you may derive from finding these parasites in the stool of the patient. (4)
- Discuss three strategies you are likely to recommend to be initiated in the community of the patient in order to reduce prevalence of this parasite and any other related ones. (6)

[25 marks]