UNIVERSITY OF SWAZILAND

Faculty of Health Sciences
Department of Environmental Health Science

DEGREE IN ENVIRONMENTAL HEALTH SCIENCE

MAIN EXAMINATION PAPER 2016

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.

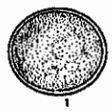
QUESTION 1 : **COMPULSORY [All students must answer this question]**

a. **MULTIPLE CHOICE:** Indicate your response to the items in this question by writing down the letter corresponding to your chosen answer. (20)

i. A parasite is recovered from the bloodstream of a human host and found to have flagella for movement. The parasite is likely to be:

A. *Plasmodium falciparum*
B. *Giardia lamblia*
C. *Cryptosporidium parvum*
D. *Trichomonas vaginalis*
E. *Trypanosoma brucei rhodesiense*

ii. A laboratory technologist performs routine stool analysis and identifies the parasite stage shown below:



The laboratory technologist is likely to conclude that the patient is infected with:

A. *Toxoplasma gondii*
B. *Isospora belli*
C. *Cryptosporidium parvum*
D. *Schistosoma mansoni*
E. *Trichuris trichiura*

iii. Which of the parasites below may be found in the urine of infected humans and has the ability to be transmitted through sexual exposure to an infected person?

A. *Schistosoma haematobium*
B. *Trypanosoma rhodesiense*
C. *Plasmodium falciparum*
D. *Trichomonas vaginalis*
E. *Schistosoma mansoni*

iv. Which of the drugs below has the ability to destroy or kill mature gametocytes in the blood of an infected host following treatment?

A. Artemether-lumefantrine
B. Lumefantrine
C. Primaquine
D. Artemether
E. All of these drugs

v. Which of the parasites below result in severe disease among people that are immunocompromised due to co-infection with the human-immunodeficiency virus?

A. *Entamoeba histolytica*
B. *Toxoplasma gondii*

C. *Cryptosporidium parvum*
D. Both B and C
E. All of the parasites above

vi. A patient of malaria reports malarial attacks every 48 hours. Which of the following species is the patient likely to be infected with?
A. *Plasmodium malariae* and *Plasmodium falciparum*
B. *Plasmodium ovale* and *Plasmodium malariae*
C. *Plasmodium vivax* and *Plasmodium ovale*
D. *Plasmodium vivax* and *Plasmodium falciparum*
E. *Plasmodium vivax* and *Plasmodium malariae*

vii. Which one of the flukes below may cause haemoptysis (coughing of blood) that often has fatal results?
A. *Fasciola hepatica*
B. *Fasciolopsis buski*
C. *Clonorchis sinensis*
D. *Schistosoma mansoni*
E. *Paragonimus westermani*

viii. Which one of the flukes below DOES NOT form the metacercaria stage?
A. *Fasciola hepatica*
B. *Fasciolopsis buski*
C. *Paragonimus westermanni*
D. *Schistosoma haematobium*
E. None of the above

ix. Which one of the parasites below causes disease through allergic reaction?
A. *Giardia lamblia*
B. *Entamoeba histolytica*
C. *Enterobius vermicularis*
D. *Plasmodium falciparum*
E. *Taenia solium*

x. Which of the parasite below is likely to be recovered from the lungs of an infected host?
A. An egg of Ancylostoma *duodenale*
B. A cyst of *Entamoeba histolytica*
C. A larva of *Fasciola hepatica*
D. A larva of *Necator americanus*
E. A larva of *Taenia solium*

b. **TRUE OR FALSE:** Write **T** (for True) or **F** (for False) against each of the statements below to indicate your response. (5)
   i. Parasites entering a particular host commonly result in asymptomatic disease because they are not recognised by the host's immune mechanisms as self.
   ii. *Entamoeba histolytica* is the only pathogenic parasite belonging to the Phylum Sarcodina.
   iii. Some helminthes result in infection of their host through skin penetration by larval stages.
   iv. Ascariasis may result from ingestion of eggs in freshly passed faeces of infected human host
   v. *Toxoplasma gondii* commonly result in asymptomatic infection among human hosts

[25 marks]

QUESTION 2

Infection with *Entamoeba histolytica* and *Balantidium coli* often result in fulminating dysentery and the development of ulcers among infected hosts.

a. Using symptoms only, how can you differentiate between dysentery caused by *Entamoeba histolytica* and that caused by *Balantidium coli*? (2)
b. How can you differentiate the ulcers caused by *Entamoeba histolytica* from those caused by *Balantidium coli*? (2)
c. Explain why *Entamoeba histolytica* infections often result in extra-intestinal infection while *Balantidium coli* infections are commonly localised in the gastro-intestinal tract? (4)
d. Name three sites that are primarily involved in extra-intestinal amoebiasis. (3)
e. Discuss how infection with Entamoeba histolytica and Balantidium coli is often confirmed in the health facility. (3)
f. Name the drugs you would recommend for successful treatment of:
   i. non-invasive amoebiasis (1)
   ii. invasive amoebiasis (1)
   iii. balantidiasis (1)
g. Balantidiasis is largely considered a zoonotic disease. Name two animals that are often reservoirs of the disease. (2)
h. Discuss THREE community initiatives that often have a major impact in reducing incidence of both amoebiasis and balantidiasis. (6)

[25 marks]

QUESTION 3

A laboratory technologist at one health facility in Swaziland uses microscopy to confirm infection of a patient from South-East Asia suspected with malaria. He identifies several red blood cells showing the following morphology.

a. Name two malaria species the patient may be infected with. (2)
b. Why are these parasites less likely to be identified among patients from Swaziland? (2)
c. Describe one limitation of Rapid Diagnostic Tests (RDTs) against microscopy in confirming infection with the parasite shown above. (2)
d. What treatment is the attending medical officer likely to prescribe to the patient in order to successfully relieve symptoms associated with malaria and to reduce possibilities of transmitting the parasite to other susceptible local people? (2)
e. What symptoms are likely to be reported by the patient to lead to suspicion of infection with these parasites? (4)
f. Identification of these parasites in the patient in Swaziland could lead to established local transmission. Discuss TWO strategies the National Malaria Control Programme (NMCP) is likely to initiate to limit or prevent local transmission of these parasites. (4)
g. Is this patient likely to suffer from cerebral complications? Give reasons for your answer. (3)
h. Discuss THREE pieces of advice the attending medical officer is likely to give to the patient in order to prevent introduction of these parasites following future visits to his home country in South-East Asia. (6)

[25 marks]

QUESTION 4

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. Very often, health facilities determine the presence of antibodies specific to *Toxoplasma gondii* to confirm infection rather than identification of certain stages of the parasite.
   i. Explain how a pregnant woman may acquire infection with *Toxoplasma gondii*. (2)
   ii. Name the two antibodies used during the confirmation of infection with *Toxoplasma gondii*. (2)
   iii. Explain how the two antibodies are used to determine the time of infection of a pregnant woman. (2)
   iv. Explain why it is important to use these antibodies to determine the time of infection in pregnant women? (2)

[25 marks]

QUESTION 5

a. Give a detailed description of the life cycle of *Schistosoma mansoni* from the time a human host acquires infection until eggs of the parasite are passed out in the faeces. (10)
b. *Schistosoma mansoni* infections often result in formation of granulomata in the liver. Explain how granulomata are formed in the liver. (2)
c. Victims of intestinal schistosomiasis result in expulsion of bloody faeces. Where does the blood come from? (3)

d. Children are more commonly infected with schistosomiasis than adults. Discuss the events that lead to children acquiring infection with schistosomiasis. (6)
e. Name one drug often used to treat children infected with *Schistosoma mansoni*. (1)
f. Discuss TWO measures you may initiate in a community with high schistosomiasis incidence in children to reduce infection. (3)

[25 marks]

QUESTION 6

Soil-transmitted helminthiasis results from human infections with THREE parasites.

a. Name the three parasites. (3)
b. Discuss how human infection with each of the parasites mentioned in (a) above occurs. (6)
c. One of the parasites named above causes prolapses of the rectum among infected children. Name the parasite and explain the cause of the prolapses. (3)
d. One of the parasites causes malnutrition in children. Name the parasite and explain the cause of malnutrition. (3)
e. Discuss strategies you would suggest to reduce human infections with each of the parasites mentioned in (a) above. (10)

[25 marks]