UNIVERSITY OF SWAZILAND

FACULTY OF HEALTH SCIENCES

FINAL EXAMINATION PAPER – DECEMBER, 2010

TITLE OF PAPER	:	INTRODUCTION TO PARASITOLOGY
COURSE CODE	:	HSC 104
TIME	:	2 HOURS
MARKS	:	100

INSTRUCTIONS	:	ANSWER QUESTION 1 AND FOUR OTHERS
	:	QUESTION 1 IS COMPULSORY
	:	EACH QUESTION IS 20 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
	:	ALL CALCULATIONS/WORK OUT DETAILS SHOULD BE SUBMITTED WITH YOUR ANSWER SHEET

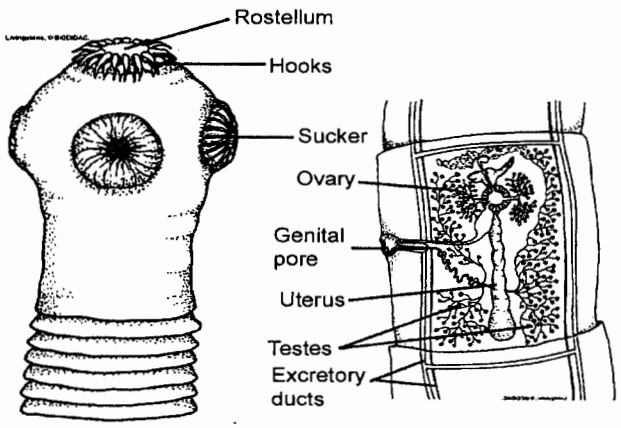
ANSWER QUESTION 1 AND ANY FOUR QUESTIONS FROM THIS SECTION.

QUESTION 1 [COMPULSORY]

i. The symptoms: Iron deficiency anaemia, hypoalbuminemia, fatigue, pallor, burning epigastric pain, anorexia, diarrhoea, nausea and vomiting, coughing, dyspnoea, blood-tinged sputum and asthma-like symptoms are associated with which one of the helminths below:
   A. Ascaris lumbricoides
   B. Schistosoma mansoni
   C. Ancylostoma duodenale
   D. Trichuris trichiura
   E. Fasciola hepatica

ii. Thick blood smears are often preferred over thin smears for malaria diagnosis in low endemic areas because:
   A. they concentrate the red blood cells, making it easier to come across an infected cell without searching too wide
   B. they make it easier to identify the species of the parasite involved
   C. it is easier to determine the parasitaemia and estimate the seriousness of the infection in the patient
   D. thick blood smears obtain blood from peripheral circulation where the parasites are many
   E. thick blood smears stain better in Giemsa than thin smears

iii. Shown below is an illustration of the scolex and the proglottid of a tapeworm. The name of the tapeworm shown is

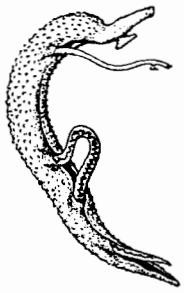


   A. Taenia saginata
   B. Taenia solium
   C. Diphylobothrium latum
   D. Dypilidium caninum
   E. Hymenolepis nana

iv. Which one of the following is a true differential diagnosis of amoebic dysentery and bacillary dysentery?

A. Bacillary dysentery has a gradual onset while amoebic dysentery has an acute onset
B. Bacillary dysentery produces little fever in adults yet amoebic dysentery results in high fever
C. Bacillary dysentery results in moderate tenesmus while amoebic dysentery results in severe tenesmus
D. Bacillary dysentery is associated with severe dehydration while dehydration is uncommon or only occurs moderately in amoebic dysentery
E. Polymorphonuclear leukocytosis is absent in bacillary dysentery but present in amoebic dysentery.

v. Identify the species of worms shown in the diagram below:

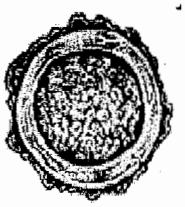


A. Schistosoma haematobium
B. Trichuris trichiura
C. Schistosoma mansoni
D. Schistosoma haematobium
E. Ascaris lumbricoides

vi. Which one of the following is associated with protection against *P. vivax* infection?

A. Glucose-6-phosphate dehydrogenase deficiency
B. Beta-thalassemia disorders
C. Haemoglobin S disorders
D. Duffy blood factor deficiency
E. Haemoglobin K disorders

vii. The egg shown below is:



A. a fertilised egg of *Ascaris lumbricoides*
B. a decorticated egg of *Ascaris lumbricoides*
C. an unfertilised egg of *Ascaris lumbricoides*
D. a fertilised egg of *Trichuris trichiura*
E. a fertilised egg of *Ancylostoma duodenale*

viii. Protein deficiency is associated with

A. Trichuris trichiura
B. Ascaris lumbricoides
C. Enterobius vermicularis
D. Diphylobothrium latum
E. Fasciolopsis buski

ix. Infection with cysticercosis disease is associated with

A. Taenia solium
B. Taenia saginata
C. Diphylobothrium latum
D. Hymenolepis nana
E. Both *Taenia solium* and *Taenia saginata*

x. Which one of these parasitic flukes does not cause human infection through ingestion of metacercariae?

A. Clonorchis sinensis
B. Fasciolopsis buski
C. Schistosoma haematobium
D. Paragonimus westermani
E. Fasciola hepatica

QUESTION 2

a. During infection with *Plasmodium falciparum* parasites, 'cerebral malaria' develops and results in acute mental disturbances. Explain the pathophysiology that results in cerebral malaria. (3)

b. Besides cerebral involvement, *P. falciparum* infections produce more serious infections than the other 3 species of malaria. Explain why, giving 3 reasons, *P. falciparum* infections result in more severe disease. (6)

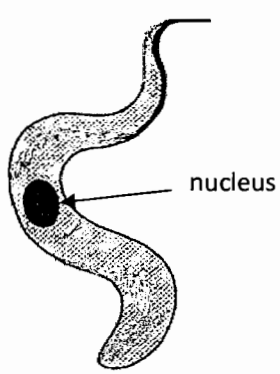
c. The drug of choice for treating uncomplicated malaria in Swaziland has been chloroquine until April 2009 when a new drug was adopted.
   i. Explain why Swaziland no longer uses chloroquine for the treatment of uncomplicated malaria? (2)
   ii. Name the current drug of choice used in Swaziland for treating uncomplicated malaria? (2)
   iii. Name one drug used in Swaziland for treating complicated malaria. (1)

d. Insecticide treated nets (ITNs) has been one of the interventions in an integrated approach to malaria control in Swaziland since 2003. Explain why ITN distribution prioritises:
   i. children 0 to 5 years, and (3)
   ii. pregnant mothers (3)

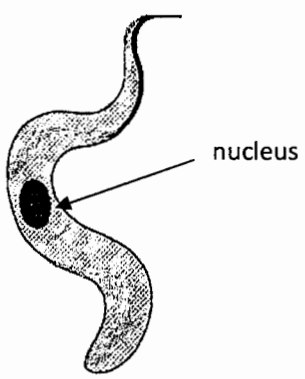
[20 marks]

QUESTION 3

a. Given below are two diagrams of the epimastigote and trypomastigote stages of trypanosomes. Insert and label the kinetoplast in each diagram to show an understanding of the morphological differences between the two stages. (4)



Epimastigote



Trypomasitogote

b. The trypanosomes undergo multiplication 3 times in different stages of their life cycle.
   i. What is the method of reproduction utilised by trypanosomes during multiplication? (1)
   ii. Name the 3 sites (including the stages of the parasites involved) where multiplication occurs. (6)
c. Briefly discuss the symptoms involved at each of the stages of trypanosomiasis shown below:
   i. Chancre phase (2)
   ii. Haemolymphatic phase (2)
   iii. Meningoencephalitic phase (3)
d. Name the drugs used to treat:
   i. East African trypanosomiasis (1)
   ii. West and central African trypanosomiasis (1)

[20 marks]

QUESTION 4

Both *Isospora belli* and *Cryptosporidium parvum* have gained importance world-wide because of their association with Human Immunodeficiency Virus (HIV) infection.

a. Explain how isosporiasis and cryptosporidiosis transmission to humans occur. (4)
b. Discuss briefly the symptoms of the two diseases in Acquired Immune Deficiency Syndrome (AIDS) patients:
   i. isosporiasis (3)
   ii. cryptosporidiosis (3)
c. Both isosporiasis and cryptosporidiosis can be diagnosed using the same method. Discuss the method that may be used to successfully diagnose both isosporiasis and cryptosporidiosis. (2)
d. Name one treatment drug used for each of the diseases, isosporiasis and cryptosporidiosis. (2)
e. Discuss 3 community strategies that would be effective in reducing incidence of both isosporiasis and cryptosporidiosis. (6)

[20 marks]

QUESTION 5

a. Explain how human infections with the following helminths may occur:
   i. *Schistosoma haematobium* (2)
   ii. *Ancylostoma duodenale* (2)
   iii. *Ascaris lumbricoides* (2)
b. Name one drug that may be used to successfully treat human infections with both *Ancylostoma duodenale* and *Necator americanus*. (1)

c. Diagnosis of hookworm disease through examination of faeces for identification of characteristic eggs cannot be performed to the species level.
   i. Explain why the species of hookworm cannot be determined from faeces examination. (2)
   ii. One method that may be used to decide species of hookworm to the species level is through cultivation of eggs and examining the larval stages that hatch out.
   What name is given to the larval stage of hookworm that hatches from the egg? (1)
   Explain how you may use this larval stage to differentiate between *Ancylostoma duodenale* and *Necator americanus*. (2)
   iii. Discuss TWO other methods that are used to differentiate between the species of infecting hookworm adult worms. (4)
d. Discuss two methods by which individuals may prevent infections with hookworm. (4)

[20 marks]

QUESTION 6

a. With respect to the life cycle of *Strongyloides stercoralis*, explain what you understand by the:
   i. direct development cycle, and (2)
   ii. the indirect development cycle (2)
   iii. What symptoms would make you suspect *Strongyloides stercoralis* infection in a patient? (3)
   iv. Mention one method you may use to confirm the suspicion of infection with *Strongyloides stercoralis*? (2)

b. Many children in Swaziland suffer from intestinal schistosomiasis that results in hepatomegaly and urinary schistosomiasis that may cause haematuria or dysuria.
   i. Explain what cause hepatomegaly and haematuria in schistosomiasis. (4)
   ii. Name one drug that may successfully be used to treat schistosomiasis in children. (1)
   ii. Discuss a community control programme that you can set up to reduce human contact with contaminated water in a rural setting, thereby bringing about a reduction in incidence of schistosomiasis. (6)

[20 marks]

QUESTION 7

a. Mention three differences between members of the Subphyla Platyhelminthes and nemathelminthes. (6)

b. Write down a second intermediate host on which the metacercariae of the following trematodes encyst:

   i. Fasciolopsis buski (1)

   ii. Clonorchis sinensis (1)

   iii. Fasciolopsis buski (1)

   iv. Paragonimus westermanni (1)

c. Name one drug that is commonly used to successfully treat all the trematodes. (1)

d. i. Explain spurious fascioliasis. (2)

   ii. Explain how spurious fascioliasis affect diagnosis and also mention how the problem may be avoided. (2)

e. Discuss two methods that may be used to prevent or reduce incidence of fascioliasis at a community that is endemic for the disease. (4)

[20 marks]