

UNIVERSITY OF SWAZILAND
FACULTY OF HEALTH SCIENCES

FINAL EXAMINATION PAPER – DECEMBER 2009

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/WORKOUT DETAILS SHOULD BE SUBMITTED WITH YOUR ANSWER SHEET

Answer **QUESTION 1** and **ANY FOUR** others.

QUESTION 1 MULTIPLE CHOICE : indicate your response by writing the letter corresponding to your chosen answer among those given for each item.

- i. Which one of the following protozoa live in the bloodstream and tissues of man and moves by flagella?
 - A. *Toxoplasma gondii*
 - B. *Plasmodium falciparum*
 - C. *Trypanosome rhodesiense*
 - D. *Giardia lamblia*
 - E. *Trichomonas vaginalis*

- ii. The length of the bloodstage schizogonic cycle of *Plasmodium falciparum* is
 - A. 12 days
 - B. 48 hours
 - C. 72 hours
 - D. 13 – 17 days
 - E. 36 – 48 hours

- iii. Which two parasites among those given below cause a relapse?
 - A. *Plasmodium falciparum* and *Plasmodium malariae*
 - B. *Plasmodium falciparum* and *Plasmodium ovale*
 - C. *Plasmodium vivax* and *Plasmodium ovale*
 - D. *Plasmodium vivax* and *Plasmodium malariae*
 - E. *Plasmodium ovale* and *Plasmodium malariae*

- iv. The egg shown below is an egg of



- A. *Ascaris lumbricoides*
 - B. *Necator americanus*
 - C. *Trichuris trichiura*
 - D. *Strongyloides stercoralis*
 - E. *Schistosoma mansoni*

- v. Which one of these parasites is more prevalent in cool temperate zones than in tropical areas?
 - A. *Trichomonas vaginalis*
 - B. *Plasmodium malariae*
 - C. *Trichuris trichiura*
 - D. *Enterobius vermicularis*
 - E. *Pneumocystis carinii*

- vi. Which nematode(s) among those given below has a life cycle that involves

lung migration?

- A. *Ascaris lumbricoides*
- B. *Necator americanus*
- C. *Ancylostoma duodenale*
- D. *Strongyloides stercoralis*
- E. All of the above

vii. The infective stage of hookworm is

- A. the egg
- B. filariform larva
- C. rhabditiform larva
- D. the microfilaria
- E. the cercaria

viii. The infective stage of *Toxoplasma gondii* is the

- A. tachyzoite
- B. egg
- C. bradyzoite
- D. sporozoite
- E. oocyst

ix. Which one of the statements below is not true about helminths of the class Nematoda?

- A. Reproduction may be oviparous or larviparous
- B. In general, the sexes are separate
- C. Consists of unsegmented and segmented roundworms
- D. They possess a mouth, oesophagus and anus
- E. Infection is commonly by ingestion of eggs

x. In order for more eggs of *Schistosomiasis haematobium* to be excreted, before a urine sample is taken, the patient may be asked to

- A. Perform 20 rapid knee-bends
- B. Run 100 metres
- C. Run up and down the stairs several times
- D. All of the above
- E. Drink a lot of water in the morning

QUESTION 2

Entamoeba histolytica and *Balantidium coli* both cause fulminating dysentery in man.

- a. Explain how you may differentiate between:
 - i. Symptoms of the two protozoan parasites (2)
 - ii. Trophozoites of the two parasites (2)
- b. How would you differentiate an amoebic ulcer from a balantidial ulcer using appearance alone? (2)
- c. A patient suffering from pulmonary amoebiasis describes expectoration of a bitter, bile flavoured, liver coloured pus. Explain the origin of the pus. (3)
- d. Explain the pathogenesis of *Entamoeba histolytica* that results in production of ulcers in the intestines. (2)
- e. i. When a trophozoite of *Entamoeba histolytica* is found to have ingested red blood cells, what can be deduced about the pathogenesis of the patient? (2)
ii. What is the best drug for treating this stage of illness of the patient? (1)
- f. Discuss 3 possible intervention programmes you may institute at community level to cause reduction of both *Entamoeba histolytica* and *Balantidium coli* prevalence. (6)

[20 marks]

QUESTION 3

- a. With respect to trypanosomes:
 - i. Name the stage found in the blood of man and the stage found in the arthropod vector (2)
 - ii. How can you use structural differences to differentiate between the two stages of trypanosomes (2)
 - iii. Give the genus name of the arthropod vectors responsible for transmission of African trypanosomiasis and for malaria (2)
 - iv. Explain why it is recommended to collect blood to be used for diagnosis of both trypanosomiasis and malaria during the period when the patient is going through a febrile episode? (3)
- b. Insecticide treated bednets (ITNs) is one strategy used to protect individuals from bites of mosquitoes.
 - i. Explain why pregnant women are prioritised in the distribution of ITNs. (2)
 - ii. Explain why children < 5 years are also prioritised (2)
 - iii. Mention, giving a reason, one other group that you think should be prioritised alongside pregnant women and children < 5 years during the distribution of ITNs. (3)
- c. i. Explain the process that leads to pregnancy associated malaria (2)
ii. In Swaziland, both chloroquine and artemether-lumefantrine cannot be used to treat a pregnant woman infected with *Plasmodium falciparum*. Explain why? (2)

[20 marks]

QUESTION 4

- a. Surveys for toxoplasmosis prevalence have yielded rates above 75% in people 25 years and older.
- Name the reservoir host responsible for major spread of toxoplasmosis in man. (1)
 - Explain the process through which the toxoplasmosis parasites leave the reservoir host until they infect man. (3)
 - Mention two other methods by which man can acquire infection with toxoplasmosis. (2)
- b. Toxoplasmosis may produce very severe symptoms in a newborn baby following congenital transmission.
- Mention one symptom of toxoplasmosis that may be seen in the newborn. (1)
 - Explain why toxoplasmosis is very severe if acquired neo-natally than when acquired post-natally. (2)
- c. Toxoplasmosis and pneumocystis carinii pneumonia (PCP) have gained importance in the last two decades. Explain why? (4)
- d. i. Mention one major symptom in advanced PCP that would lead to strong suspicion for the disease. (1)
- iii. Why has the control of PCP remained difficult even when the disease has become a major problem worldwide? (2)
- e. Suggest one method you may use to prevent infection with *Pneumocystis carinii*, explaining your answer. (4)

[20 marks]

QUESTION 5

- a. A patient complains of difficulty in breathing, chest pains, paroxysmal coughing and blood in sputum.
- What parasitic infection do you think the patient is infected with? (1)
 - Explain what causes the paroxysmal cough. (2)
 - How do you suppose, the patient acquired the infection? (2)
 - Mention FIVE control strategies that may be instituted among individuals and in the community to reduce prevalence of the disease. (5)
- b. Hepatic and intestinal flukes are common causes of infections of man and domestic animals in Swaziland.
- Name one hepatic fluke and one intestinal fluke responsible for major infections among the Swaziland population. (2)
 - What are the common names of the two flukes mentioned in (i) above. (2)
 - Man is accidentally infected with the hepatic fluke. What is the usual host of the fluke. (1)
 - Name one drug you may use to treat infections with each of the two flukes in (i). (2)
 - Mention 3 strategies that may be instituted to control distribution of the intestinal flukes in Swaziland. (3)

[20 marks]

QUESTION 6

- a. With respect to *Enterobius vermicularis*, explain how autoinfection in children perpetuates the disease among those infected. (2)
- b. Explain how you may confirm the diagnosis of the following worm infections
 - i. *Trichuris trichiura* (2)
 - ii. *Enterobius vermicularis* (2)
 - iii. *Ascaris lumbricoides* (2)
- c. With respect to *Trichuris trichiura*, *Enterobius vermicularis* and *Ascaris lumbricoides*:
 - i. Which of the helminthic worms in (b) is associated with a prolapsed rectum? (1)
 - ii. Which one is commonly associated with nutritional impairment? (1)
 - iii. Which one commonly causes liver abscesses in children? (1)
 - iv. Name one drug you may use to successfully treat all the helminthic infections in (a) above. (1)
- d. List 4 strategies that may reduce transmission of *Enterobius vermicularis* in an overcrowded children's institution. (4)
- e. Mention 4 strategies you may recommend in a community to reduce prevalence of both *Trichuris trichiura* and *Ascaris lumbricoides*. (4)

[20 marks]

QUESTION 7

- a. Both hookworm and strongyloidiasis are prevalent in the lowveld of Swaziland and not in the highveld. Explain what characteristics of the lowveld favour transmission of the two parasitic infections in Swaziland. (2)
- b. The eggs of hookworm and *Strongyloides stercoralis* cannot be differentiated. Therefore, diagnosis of the two worms relies on identification of either rhabditiform or filariform larvae.
 - i. How does the "larva migrans" of hookworm differ from that of *Strongyloides stercoralis*. (2)
 - ii. Explain how you may differentiate between a rhabditiform larva and a filariform larva. (2)
 - iii. Explain how you may differentiate between the filariform larva of hookworm and that of *Strongyloides stercoralis*. (2)
 - iv. Name the best drug you may recommend for the successful treatment of hookworm and strongyloidiasis. (2)
 - v. Besides chemotherapy, what other supportive treatment is recommended for a hookworm patient with a heavy infection? Explain why. (2)
- c. With respect to *Strongyloides stercoralis*, define internal autoinfection and external autoinfection. (2)
- d. Mention three areas of the body that are commonly points of entry for hookworm and *Strongyloides stercoralis* during contraction of an infection. (3)
- e.
 - i. Mention one way in which individuals may prevent infection with hookworm. (1)
 - ii. Mention two ways in which spread of hookworm or strongyloidiasis may be prevented in a community. (2)

[20 marks]