

# **UNIVERSITY OF SWAZILAND**

## **FACULTY OF HEALTH SCIENCES**

### **MAIN EXAMINATION PAPER – DECEMBER, 2011**

**TITLE OF PAPER : INTRODUCTION TO PARASITOLOGY**

**COURSE CODE : HSC 104**

**TIME : 2 HOURS**

**MARKS : 100**

**INSTRUCTIONS :**

- ANSWER QUESTION 1 AND ANY FOUR OTHER QUESTIONS**
- 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**

### QUESTION 1: MULTIPLE CHOICE (Compulsory)

Indicate your response to the sub-questions by writing the letter corresponding to your chosen answer among those given below:

- i. Which two parasites below are heteroxenous i.e. have life cycles involving one or more intermediate hosts?
- A. *Trichomonas vaginalis* and *Trypanosoma rhodesiense*
  - B. *Ascaris lumbricoides* and *Trichomonas vaginalis*
  - C. *Plasmodium falciparum* and *Toxoplasma gondii*
  - D. *Ascaris lumbricoides* and *Plasmodium falciparum*
  - E. *Ascaris lumbricoides* and *Toxoplasma gondii*
- ii. Which one of the parasitic infections below CANNOT be controlled by provision of a safe domestic water supply to a community?
- A. giardiasis
  - B. schistosomiasis
  - C. cryptosporidiosis
  - D. malaria
  - E. balantidiasis
- iii. Which one of the parasitic infections below CANNOT be controlled by provision of sanitary methods of human faecal disposal, e.g. toilets?
- A. schistosomiasis
  - B. toxoplasmosis
  - C. trichuriasis
  - D. hookworm disease
  - E. amoebiasis
- iv. The eggs on the right were found using the scotch tape test on a 6 year old Florida boy visiting relatives in Kansas. The eggs measured about 55 micrometers long x 25 micrometers wide. What species does it represent?
- A. *Ascaris lumbricoides*
  - B. *Enterobius vermicularis*
  - C. *Necator americanus*
  - D. *Schistosoma haematobium*
  - E. *Trichuris trichiura*



- v. Which of the parasitic infections below is exacerbated by concurrent infection with HIV?
- A. toxoplasmosis
  - B. amoebiasis
  - C. cryptosporidiosis
  - D. isosporiasis
  - E. All of the above
-

- vi. Which one of the following is NOT a possible symptom of toxoplasmosis infection in a pregnant woman?
- a miscarriage or spontaneous abortion.
  - a baby born with low birth weight
  - a stillborn baby.
  - a baby born with signs of toxoplasmosis (for example, abnormal enlargement or smallness of the head i.e. birth defects).
  - a baby with brain or eye damage (retinochoroiditis)
- vii. Amoebomas are associated with:
- Plasmodia* infection
  - Entamoeba histolytica* infection
  - Hookworm infection
  - Toxoplasmosis
  - Ascariasis
- viii. Which one of the following anti-malarial drugs is used to treat uncomplicated malaria in Swaziland?
- Quinine
  - Chloroquine
  - Artemether-lumefantrine
  - Mefloquine
  - Artesunate-sulphadoxine/pyrimethamine

- ix. The photograph on the right is from a human fecal smear. The cyst measured about 55 micrometers in diameter. The patient had moderate diarrhea. What species is represented?

- Balantidium coli*
- Endolimax nana*
- Entamoeba coli*
- Entamoeba histolytica*
- Toxoplasma gondii*



- x. The photograph on the right is from a faecal smear. The patient had periodic bouts of diarrhoea. The parasite measures about 12 micrometers in length. What species is represented?

- Giardia lamblia*
- Pentatrichomonas hominis*
- Trichomonas vaginalis*
- Trypanosoma cruzi*
- Toxoplasma gondii*



## QUESTION 2

- a. A 4-year old child is brought to a health facility with the following complaints:

*Acute or chronic intermittent diarrhoea, mild to severe, with bulky, greasy, frothy, foul stool free of blood and mucus. Upper abdominal discomfort, nausea, anorexia, distention, gurgling, increased foul flatus, fatigue, and weight loss.*

The health facility performed a stool and demonstrated cysts and occasionally trophozoites. Trophozoites were further demonstrated in duodenal fluid and biopsy from duodenojejunal area.

- i. Name the parasite that you think has infected the child? (1)
  - ii. How do you think the child acquired the infection? (2)
  - iii. Discuss the treatment course you would prescribe for the child. (3)
  - iv. What advice would you give to the parents of the child to prevent future infection with the disease? (4)
- b. The organism shown below is identified from the urinalysis of a 15-year old girl.



- i. Write down the technical name and the stage of the organism shown above. (2)
- ii. How does this organism differ structurally with the organism identified from the stool of the child in (a) above. (3)
- iii. Name the drug you would prescribe to this girl. (1)
- iv. List, in a point form, the contents of the health talk you would give to this girl as part of the assistance you are expected to provide. (4)

[20 marks]

## QUESTION 3

- a. Consider the statement: "Low levels of helminth infection in humans can be tolerated, but low levels of protozoan infections cannot be tolerated". Using *Plasmodium falciparum* and *Ascaris lumbricoides*, submit your argument in support or against this statement. (4)
- b. Consider the statement: "Environmental control involves altering the environment so that target species can no longer find habitats suitable for its survival and multiplication". Discuss the statement with regard to:
  - i. mosquito control (4)
  - ii. schistosomiasis control (4)
- c. For a long time, malaria in many health facilities in Swaziland has been treated presumptively, i.e. without laboratory confirmation. List FOUR problems that commonly arise as a result of presumptive treatment of malaria. (4)

- d. Rapid diagnostic tests (RDTs) have been deployed in almost all health facilities in Swaziland for quick diagnosis of malaria to aid the prescribing healthcare worker. Write down two advantages of RDTs over microscopy in the diagnosis of malaria. (2)
- e. Indoor residual spray (IRS) with pyrethroids and DDT have been the mainstay of malaria control in Swaziland. Explain how IRS strategy works to control mosquitoes in a sprayed human dwelling. (2)

[20 marks]

#### QUESTION 4

- a. Approximately 4% of AIDS patients reporting to the Centre for Diseases Control (Atlanta, USA) are infected with cryptosporidiosis when AIDS is diagnosed.
  - i. Why is cryptosporidiosis common among AIDS patients? (2)
  - ii. Describe two ways an individual may become infected with cryptosporidiosis. (2)
  - iii. Explain how cryptosporidia cause diarrhoea in infected individuals. (3)
  - iv. Discuss three intervention strategies you would recommend at community level to reduce or remove *Cryptosporidium* infections. (6)
- b. A similar protozoan, *Isospora belli*, produce similar symptoms similar to cryptosporidiosis in AIDS patients.
  - i. Diagnostically in the laboratory, how can you differentiate between *Isospora belli* and *Cryptosporidium* parasites? (4)
  - ii. Symptomatically or clinically, how can you differentiate between isosporiasis and cryptosporidiosis? (3)

[20 marks]

#### QUESTION 5

- a. Write down the infective stages of the following parasites:
  - i. *Schistosoma mansoni*
  - ii. *Taenia solium*
  - iii. *Paragonimus westermani*
  - iv. *Taenia saginata*
  - v. *Diphyllobothrium latum*
  - vi. *Fasciolopsis buski*

(6)

- b. Fill in the blanks in the following passage about schistosomiasis life cycle.

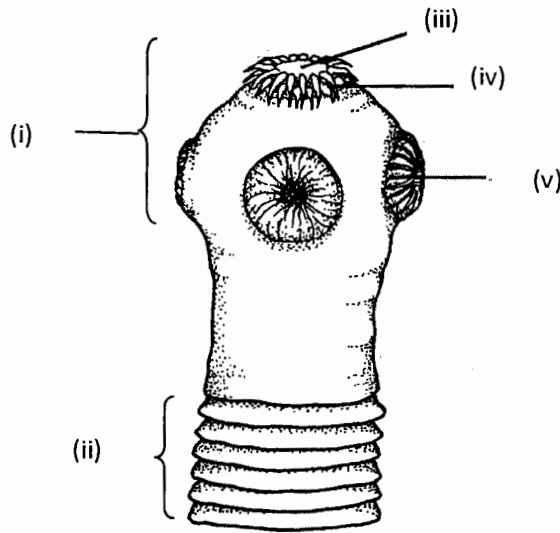
The life cycle of schistosomiasis begins when eggs shed in .....(i)..... or .....(ii)..... enter water bodies. The eggs hatch and release a .....(iii).....that penetrates the appropriate species of .....(iv)..... In the .....(iv)....., there is development to produce .....(v).....that further develop to produce .....(vi)..... The .....(vi)..... escape the .....(iv).....and swims in the water until it penetrates the skin of an unsuspecting human host. (6)

- c. Design a community programme that you could set up to reduce high prevalence of schistosomiasis among school children. Include all preliminary information that you would collect in order to design your interventions. (8)

[20 marks]

**QUESTION 6**

- a. Shown below is part of the body of *Taenia solium*. Label the parts marked (i) to (v).



(5)

- b. How does this structure differ from that of:
- Taenia saginata*; and (2)
  - Diphyllobothrium latum* (2)
- c. Write T (true) or F (false) for each of the statements about tapeworms below:
- Cestodes lack a digestive tract at any stage of their life cycle.
  - Some tapeworms are dioecious, but the majority are hermaphrodites
  - Larval stages of some species can multiply asexually in the intermediate hosts.
  - Humans are the obligatory final hosts of *Taenia solium* and *T. saginata*
  - Most carriers of adult tapeworms show symptoms that include mild diarrhoea and mild skin disorders
- (5)
- d. Discuss three community interventions you would recommend to reduce prevalence of beef tapeworm infections among the adult population. (6)

[20 marks]

**QUESTION 7**

- a. Match the helminths below with the estimated number of people infected worldwide by writing the Roman numeral against the corresponding number (Greek numeral) on the left e.g. 7.ii.

**Helminth**

1. *Trichuris trichiura*
2. *Ascaris lumbricoides*
3. *Enterobius vermicularis*

**Total infected worldwide**

- i. 1 billion people
- ii. 200 million people
- iii. 500 million people

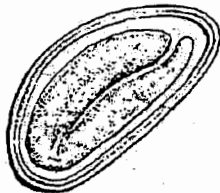
(3)

- b. Discuss briefly how you would confirm the presence of the three helminths above in a suspected human host

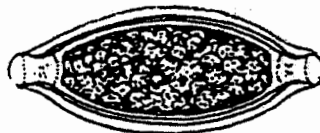
- i. *Trichuris trichiura* (2)
- ii. *Ascaris lumbricoides* (2)
- iii. *Enterobius vermicularis* (3)

- c. Name one drug you would recommend to successfully de-worm children infected with all three worms listed above in (a) and (b). (1)

- d. Identify the diagrams of helminths eggs shown below with the species of parasites they represent.



.....(i).....



.....(ii).....



.....(iii).....

(3)

- e. Discuss three community interventions that would reduce prevalence of all three helminths. (6)

**[20 marks]**