

UNIVERSITY OF SWAZILAND
FACULTY OF HEALTH SCIENCES

MAIN EXAMINATION PAPER – DECEMBER, 2015

TITLE OF PAPER : **INTRODUCTION TO PARASITOLOGY**
COURSE CODE : **EHS 107**
TIME : **2 HOURS**
MARKS : **100**

INSTRUCTIONS :

- ANSWER QUESTION 1 AND ANY THREE 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**

This question paper consists of 7 printed pages including this one

QUESTION 1 COMPULSORY : ALL STUDENTS MUST ANSWER THIS QUESTION

- a. **MULTIPLE CHOICE:** Write down the letter corresponding to your chosen response among the choices listed for each question. (20)
- i. Which one of the following statements about the relationship between a parasite and its host is NOT true?
 - A. New parasites are likely to cause severe disease or death of the host
 - B. The host's immunity often reacts to a parasite species resulting in disease
 - C. Parasites that evolved a long time ago are usually have a commensal relationship with the host
 - D. A parasitic species always require the host to survive and multiply
 - E. Some parasites enter and multiply inside the body of the host while others may only live and multiply on the body of the host

 - ii. Which one of the following parasites is single-celled and reproduces by binary fission?
 - A. *Trypanosoma rhodesiense*
 - B. *Trichuris trichiura*
 - C. *Ascaris lumbricoides*
 - D. *Taenia solium*
 - E. *Fasciola hepatica*

 - iii. Some parasites go through environmental stages in the cyst stage while others go through in the egg stage. Which of the parasites below forms a cyst stage to enhance its survival in the environment?
 - A. *Trichomonas vaginalis*
 - B. *Trypanosoma gambiense*
 - C. *Ascaris lumbricoides*
 - D. *Entamoeba histolytica*
 - E. *Ancylostoma duodenale*

 - iv. A parasite is recovered from the gastro-intestinal tract of an infected 13-year old boy. Further characterisation of the illness in the boy suggests that he has diarrhoea that is often interrupted by constipation, hunger or peptic ulcer-like pains, prostration, facial and peripheral oedema and ascites. The parasite infecting the boy is likely to be:
 - A. *Fasciola hepatica*
 - B. *Fasciolopsis buski*
 - C. *Schistosoma mansoni*
 - D. *Ascaris lumbricoides*
 - E. Either B or C

- v. Which one of the following malaria parasites causes malignant tertian malaria in humans?
- A. *Plasmodium ovale*
 - B. *Plasmodium vivax*
 - C. *Plasmodium knowlesi*
 - D. *Plasmodium falciparum*
 - E. *Plasmodium malariae*

- vi. The snail is an important vector of:
- A. *Schistosoma haematobium*
 - B. *Fasciola hepatica*
 - C. *Paragonimus westermani*
 - D. *Fasciolopsis buski*
 - E. All of the above

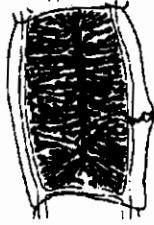
- vii. The parasitic worms shown below were recovered from a prolapsed rectum of a 4-year old girl.



Following confirmation of the presence of this parasite in the gastro-intestinal tract of the girl, the attending healthcare worker has to advise for:

- A. a review of the condition of the girl for iron deficiency anaemia
 - B. a review of the girl's condition for malnutrition
 - C. eczematous perianal skin lesions
 - D. dehydration
 - E. a review of the resistance level of the young girl
- viii. A parasite has the following characteristics: "unicellular, has no apparatus for locomotion, reproduces by sexual and asexual methods in the same host, and is released from infected hosts as an oocyst". The parasite is likely to be:
- A. *Plasmodium falciparum*
 - B. *Toxoplasma gondii*
 - C. *Cryptosporidium parvum*
 - D. *Trypanosoma rhodesiense*
 - E. *Balantidium coli*
- ix. Which one of the following is NOT a characteristic of blood flukes:
- A. They possess elongated, cylindrical bodies
 - B. Each worm has both sexes
 - C. The life cycle requires only one intermediate host
 - D. The infective stage is the cercaria
 - E. They cause major damage through the egg stage

- x. The following part of a parasite is recovered from the faeces of an infected boy.



The boy is infected with:

- A. *Taenia saginata*
 - B. *Taenia solium*
 - C. *Diphyllobothium latum*
 - D. *Fasciolopsis buski*
 - E. *Paragonimus westermani*
- b. Write **T** (for true) or **F** (for false) on each of the statements below: (5)
- i. Immunologic methods that determine the presence of antibodies are not always reliable to confirm infection with a parasite
 - ii. Environmental modification methods usually have lengthy effect in reducing vectors of most parasitic species.
 - iii. *Ascaris lumbricoides* is a large worm that remain in gastro-intestinal tract and may NOT enter the eye of an infected human hosts
 - iv. The only stage of malaria parasites infective to humans is the gametocyte
 - v. Ingestion of eggs of *Taenia solium* passed out in the stool of infected hosts may result in infection

QUESTION 2

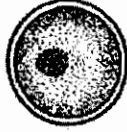
- a. A laboratory technologist examines the stool of a dysenteric patient suspected to be infected with *Entamoeba histolytica*. After several attempts with different samples from the stool of the patient, the laboratory technologist fails to identify *Entamoeba histolytica* but identifies *Entamoeba dispar*.
- i. What symptoms are likely to be reported by the patient for amoebiasis to be suspected? (3)
 - ii. Do you think the symptoms are due to *Entamoeba dispar*? Explain your response. (3)
 - iii. Why does the laboratory technologist perform several stool examinations after identifying *Entamoeba dispar*? (2)
 - iv. The laboratory technologist suspects that the patient may be suffering from extra-intestinal disease. Name three sites commonly involved in extra-intestinal amoebiasis. (3)
 - v. Explain two routes *E. histolytica* parasites commonly escape intestinal tissue to affect extra-intestinal organs. (4)
 - vi. Suggest and discuss THREE initiatives for the community of the patient to reduce chances of more people becoming infected with *E. histolytica*. (6)

- b. A community has high rates of *Trichomonas vaginalis* infection among its young population. Suggest TWO initiatives that are likely to reduce incidence of trichomoniasis in a community with high incidence rates of the disease among its young population. (4)

[25 marks]

QUESTION 3

- a. The parasite shown below is recovered a day following voidance in the faeces of a cat.



- i. Name the stage of the parasite. (1)
 - ii. A human host ingests this parasite. What will happen to the human host following ingestion of this parasite? Give reasons for your answer. (2)
 - iii. Describe one method by which the cat acquired infection with this parasite. (2)
 - iv. Explain the processes that results in the large number of this parasite produced in the gastrointestinal tract of the cat. (3)
 - v. Name one group of people commonly showing symptomatic disease related to infection with this parasite and explain why they show symptoms. (4)
- b. Name two parasites likely to produce similar stages in faeces of infected human hosts. (2)
- c. Explain how humans acquire infection with the parasites named in (b) above. (2)
- d. Briefly discuss the pathogenesis and symptoms associated with infection with the parasites mentioned in (b) above. (3)
- e. What community interventions are recommend to prevent infection and symptomatic disease with the parasites mentioned in (b) among persons in the community? (6)

[25 marks]

QUESTION 4

- a. Malaria causes serious disease and death among those infected in many Sub-Saharan countries including Swaziland.
- i. List FIVE ways people acquire infection with malaria parasites. (5)
 - ii. What symptoms are likely to be reported by a patient infected with malaria parasites? (3)
- b. Malaria treatment has changed in the last decade following the development of artemisinin-based combination therapies (ACTs) and recommendation of their adoption by the World Health Organisation.
- i. Name the artemisinin drug described in the malaria treatment guidelines for complicated malaria in Swaziland. (1)
 - ii. Name the ACT described by the malaria treatment guidelines for treatment of uncomplicated malaria. (1)
 - iii. What are the advantages of using this combination over other monotherapies? (5)
- c. Malaria incidence in Swaziland has been maintained below 1% in the last 10 years and the National Malaria Control Programme (NMCP) has adopted efforts likely to lead to total elimination of the disease. Discuss THREE strategies the NMCP has prioritised in order to maintain the reduced incidence and probably lead to elimination. (6)

- d. Discuss TWO larviciding methods often used by malaria control programmes in endemic areas.. (4)

[25 marks]

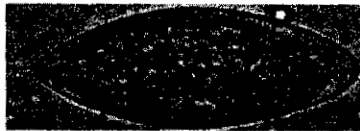
QUESTION 5

- a. Hookworms are sometimes referred to as bursate nematodes. Explain the meaning of "*bursate nematode*". (2)
- b. A hookworm penetrates the foot of a boy walking barefooted while herding cattle.
- i. Name the stage of hookworm that penetrated the boy's foot. (1)
- ii. Describe the symptoms likely to be observed at the site of skin penetration. (2)
- c. Describe the pathway of the hookworm from the foot until it establishes infection and reproduces in the intestines of the infected boy. (3)
- d. Describe the symptoms likely to occur in association with untreated heavy intestinal disease in the boy. (3)
- e. Describe TWO methods the laboratory technologist is likely to use to identify the species of hookworm infecting the boy. (6)
- f. Name one drug likely to be used to treated hookworm symptoms at:
- i. at the site of skin penetration (1)
- ii. in the gastro-intestinal tract (1)
- g. What advice is the attending healthcare worker likely to give to the boy to prevent future infection with hookworm? (2)
- h. Describe TWO community interventions likely to result in reduced hookworm infections. (4)

[25 marks]

QUESTION 6

- a. A researcher performs urine analysis and identifies eggs similar to the one shown below in 13 of 44 school children examined.



- i. What species of parasite is likely to have infected the children? (1)
- ii. Explain how the school children may have acquired infection with the parasite. (2)
- iii. Part of the symptoms reported the children include frequent urination. What causes the frequent urination? (2)
- iv. Name one drug that may be used to effectively treat the children? (1)
- v. Discuss the contents of the health talk you are likely to deliver to the parents of the children in order to instil messages likely to empower the parents with measures to prevent future infection of the children. (10)

- b. Further examination of the body mass index (BMI) of the children mentioned above reveals that some of them are stunted or malnourished and others display a wheezing cough with rales. A search of parasite eggs in stool identifies the following eggs in some and they are counted per milligram faeces of each child.



- i. What parasite are the children likely to be infected with? (1)
- ii. Why are the eggs counted? (2)
- iii. What could be the likely cause of the wheezing cough and rales? (2)
- iv. Suggest a reason why the children are stunted or malnourished? (3)
- v. What additional drug would be suggested to be given to these children to successfully treat this second infection? (1)

[25 marks]