

**UNIVERSITY OF SWAZILAND****FACULTY OF HEALTH SCIENCES****MAIN EXAMINATION PAPER – DECEMBER, 2013**

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| TITLE OF PAPER | : | INTRODUCTION TO PARASITOLOGY   |
| COURSE CODE    | : | HSC 104  |
| TIME           | : | 2 HOURS  |
| MARKS          | : | 100  |
| INSTRUCTIONS   | : | <b>ANSWER QUESTION 1 AND ANY FOUR<br/>QUESTIONS</b>                                      |
|                | : | <b>EACH QUESTION IS 20 MARKS</b>   |
|                | : | <b>NO FORM OF PAPER SHOULD BE BROUGHT INTO<br/>NOR TAKEN OUT OF THE EXAMINATION ROOM</b> |
|                | : | <b>BEGIN THE ANSWER TO EACH QUESTION ON A<br/>SEPARATE SHEET OF PAPER</b>                |
|                | : | <b>CALCULATORS MAY BE USED BUT THEY MUST BE<br/>THE SILENT TYPE</b>                      |
|                | : | <b>ALL CALCULATIONS/WORK-OUT DETAILS SHOULD BE<br/>SUBMITTED WITH YOUR ANSWER SHEET</b>  |

**This question paper consists of 7 printed pages including this one**

**QUESTION 1 MULTIPLE CHOICE [COMPULSORY]**

Indicate your responses to this question by writing the letter corresponding to your chosen response.

- i. One of the flukes below is large and cannot escape out of the intestinal tract because of its size. Which one is it?
  - A. *Fasciola hepatica*
  - B. *Fasciolopsis buski*
  - C. *Clonorchis sinensis*
  - D. *Schistosoma mansoni*
  - E. *Paragonimus westermani*
  
- ii. Which one of the following parasites is NOT normally transmitted through the oro-faecal route?
  - A. *Giardia lamblia*
  - B. *Trichuris trichiura*
  - C. *Toxoplasma gondii*
  - D. *Cryptosporidium parvum*
  - E. *Ancylostoma duodenale*
  
- iii. Humans are often infected with larval stages of some tapeworms. Which ONE of the tapeworms below has larval stages that are infectious to humans?
  - A. *Diphyllobothrium latum*
  - B. *Tinea saginata*
  - C. *Tinea solium*
  - D. *Hymenolepis nana*
  - E. All of the above
  
- iv. Which one of the parasites below commonly causes duodenal and jejunal ulcers by proteolytic enzymatic activity in man?
  - A. *Entamoeba coli*
  - B. *Necator americanus*
  - C. *Entamoeba histolytica*
  - D. *Schistosoma mansoni*
  - E. *Ascaris lumbricoides*
  
- v. Which of the malaria parasites below are commonly associated with recrudescences?
  - A. *Plasmodium falciparum* and *Plasmodium vivax*
  - B. *Plasmodium malariae* and *Plasmodium falciparum*
  - C. *Plasmodium ovale* and *Plasmodium vivax*
  - D. *Plasmodium malariae* and *Plasmodium vivax*
  - E. *Plasmodium ovale* and *Plasmodium malariae*

- vi. The stage of malaria infective to the mosquito is the
- A. sporozoite
  - B. merozoite
  - C. oocyst
  - D. gametocyte
  - E. ookinete
- vii. A laboratory technologist recovers a parasite from the intestinal tract of an infected patient by aspiration and notes that it is flagellated. Which one of the parasites below is likely to have infected the patient?
- A. *Giardia lamblia*
  - B. *Trichomonas vaginalis*
  - C. *Trypanosoma gambiense*
  - D. *Trichuris trichiura*
  - E. *Balantidium coli*
- viii. Which one of the parasites below reproduces by asexual binary fission only?
- A. *Plasmodium vivax*
  - B. *Trichomonas vaginalis*
  - C. *Enterobius vermicularis*
  - D. *Balantidium coli*
  - E. *Strongyloides stercoralis*
- ix. The infective stage of *Ancylostoma duodenale* is the:
- A. egg
  - B. filariform larva
  - C. rhabditiform larva
  - D. cyst
  - E. Both A and B
- x. Which one of the following parasites DOES NOT reproduce by sexual methods?
- A. *Plasmodium falciparum*
  - B. *Trichuris trichiura*
  - C. *Fasciola hepatica*
  - D. *Schistosoma haematobium*
  - E. *Trypanosoma rhodesiense*

[20 marks]

**QUESTION 2**

- a. Parasites use different mechanisms to cause damage and disease in their hosts. Write down ONE mechanism by which the following parasites commonly cause pathogenesis.
- i. *Ascaris lumbricoides* (1)
  - ii. *Fasciola hepatica* (1)

- iii. *Trichomonas vaginalis* (1)
  - iv. *Giardia lamblia* (1)
  - v. *Trichuris trichiura* (1)
- b. Serologic tests that identify the presence of antibodies specific for a certain antigen are often used to diagnose infection with parasitic diseases.
- i. List TWO advantages of serologic tests. (4)
  - ii. List ONE disadvantage of using serologic tests to confirm parasitic infection. (2)
  - iii. How is the disadvantage mentioned in (ii) often solved in serologic testing during parasitic disease diagnoses? (2)
- c. Describe the diagnostic method you would recommend to confirm infection with the following parasites:
- i. *Plasmodium falciparum* (4)
  - ii. *Toxoplasma gondii* (3)

[20 marks]

**QUESTION 3**

- a. Malaria infections often result in anemia, cerebral malaria and malarial attacks. Explain the cause of the following complications/symptoms in patients infected with *Plasmodium falciparum*.
- i. Anaemia (3)
  - ii. Cerebral malaria (3)
  - iii. Malarial attacks (3)
- b. The malaria case management policy in Swaziland has shifted from presumptive treatment of all fevers with chloroquine to the introduction of rapid diagnostic tests (RDTs) alongside artemisinin combination therapy.
- i. Why has presumptive therapy with chloroquine changed in Swaziland? (2)
  - ii. Why have RDTs been introduced alongside artemisinin combination therapy? (2)
  - iii. Name the artemisinin combination therapy prescribed by the antimalarial drug policy in Swaziland. (1)
- c. Malaria control programs that have long lasting impact are those involving environmental measures that reduce or prevent the breeding of *Anopheles* mosquitoes. Discuss THREE environmental measures you may suggest to a community to reduce or prevent breeding of *Anopheles* mosquitoes. (6)

[20 marks]

**QUESTION 4**

- a. A 10-year old boy reported to a health facility with complaints of having a blood in his stool and in his urine. Upon further examination, it was found that the boy also had a protuberant stomach and frequent urination. The attending healthcare worker suspects schistosomiasis infection which is confirmed through identification of eggs in faeces and urine.
- i. Describe the eggs that might have been identified in the faeces. (2)
  - ii. Describe the eggs that might have been identified in the urine. (2)

- iii. What is the likely cause of the blood in the faeces? (3)
  - iv. Suggest a reason why did the boy had a protuberant stomach? (3)
  - v. What was the cause of the frequent urination? (3)
  - vi. What drug do you think the healthcare worker might have prescribed for the boy? (1)
- b. Control of schistosomiasis infections often involve prevention of human skin-water contact. Design a community programme that you would put in place to prevent or reduce infection of young boys like the one mentioned in (a) above with schistosomiasis. (6)

[20 marks]

**QUESTION 5**

- a. An 11-year old girl showed up at a health facility with a prolapsed rectum. Upon examination it was found that the rectum had petechial and sub-epithelial haemorrhages. The attending doctor ordered a stool examination and 30 000 of the following eggs per gram of faeces were identified and counted.



- i. What species of helminth infected the girl? (1)
  - ii. How did the girl acquire the infection? (2)
  - iii. What was the cause of the petechial and sub-epithelial haemorrhages? (2)
  - iv. Why were the eggs counted? (2)
  - v. What other symptomatic assessment would you make on the girl before making a full prescription? (2)
  - vi. What prescription(s) would you make for the girl? (2)
  - vii. Discuss THREE corrective measures you would suggest to the girl to reduce chances of re-infection with the same parasite? (6)
- b. The girl mentioned in (a) above was also likely to be infected with two soil-transmitted helminthes.
- i. Name the two helminthes. (2)
  - ii. What advice (one) would you give to the parents of the girl to reduce incidence of these worms in the community? (1)

[20 marks]

**QUESTION 6**

- a. The life cycles of *Isospora belli* and *Cryptosporidium parvum* bear distinct similarities but essential differences do exist.
- Describe THREE similarities that have led to the classification of the two parasites under SubClass Coccidia. (6)
  - Describe two differences in the life cycles of the two parasites. (4)
  - Describe the route through which human infections with the two parasites commonly occur. (2)
  - Name the cells inside which reproduction of the two parasites takes place. (1)
- b. Write down the drugs you would recommend for successful treatment of isosporiasis and cryptosporidiosis. (2)
- c. Discuss FOUR community measures you may recommend to reduce the chance of infection with the two parasites. (4)
- d. Mention ONE individual measure you may recommend to an HIV-positive individual to prevent symptomatic disease from the two parasitic infections. (1)

[20 marks]

**QUESTION 7**

- a. What are the infective stages of the following parasites: (5)
- Ascaris lumbricoides*
  - Wuchereria bancrofti*
  - Strongyloides stercoralis*
  - Giardia lamblia*
  - Trichomonas vaginalis*
- b. Write down the vector responsible for human transmission of the following infections: (5)
- Bancroftian filariasis
  - Loiasis
  - Onchocerciasis
  - Trypanosomiasis
  - Schistosomiasis
- c. *Ancylostoma duodenale* and *Necator americanus* shed eggs that are morphologically indistinguishable. Discuss TWO ways adult stages of the parasites may be differentiated. (4)
- d. List THREE ways the rhabditiform larval stages of hookworm may be differentiate from those of *Strongyloides stercoralis*. (6)