

**UNIVERSITY OF SWAZILAND**  
FACULTY OF HEALTH SCIENCES

**MAIN EXAMINATION PAPER – MAY, 2019**

TITLE OF PAPER : INTRODUCTION TO PARASITOLOGY

COURSE CODE : EHS126

TIME : 2 HOURS

MARKS : 100

INSTRUCTIONS :

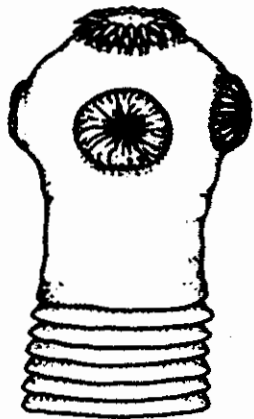
- ANSWER QUESTION 1 AND ANY THREE OTHER QUESTIONS
- EACH QUESTION CARRIES 25 MARKS
- NO FORM OF PAPER SHOULD BE BROUGHT INTO NOR TAKEN OUT OF THE EXAMINATION ROOM
- BEGIN THE ANSWER TO EACH QUESTION ON A SEPARATE SHEET OF PAPER
- CALCULATORS MAY BE USED BUT THEY MUST BE THE SILENT TYPE
- ALL CALCULATIONS/WORK-OUT DETAILS SHOULD BE SUBMITTED WITH YOUR ANSWER SHEET

**DO NOT OPEN THE QUESTION PAPER UNTIL PERMISSION TO DO SO IS GRANTED BY THE INVIGILATOR**

**QUESTION 1 [Compulsory: All students must answer this question]**

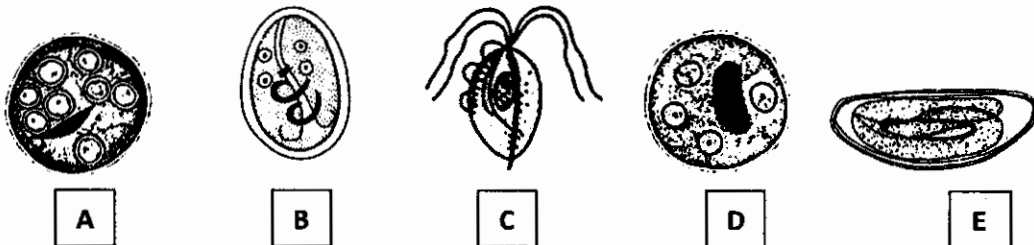
- a. Write down the letter corresponding to your chosen answer to illustrate your response to each of the items in this question.
- i. Infection of humans with *Giardia lamblia* and *Balantidium coli* both may result in acute diarrhoea. Which one of the additional information below may be used to increase suspicion of giardiasis in a patient with acute diarrhoea?
- A. The patient reporting a history of travel one or two weeks prior to appearance of symptoms
  - B. The stool having no blood or mucus in the stool
  - C. The acute diarrhoea is accompanied by severe dysentery and abdominal cramps
  - D. The patient reporting close contact with a large number of pigs
  - E. The patient reporting a high infestation of houseflies within place of residence

ii. Shown below is an illustration of the scolex 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*

iii. Which of the parasites below are normally commensals in the bodies of infected humans?



- iv. Which one of the methods below describe xenodiagnosis?
- A. Identification of parasite stages in blood using a microscope

- B. Culturing of samples from blood samples of the host and then recovering parasites
  - C. Allowing a laboratory bred vector to feed on the suspected host and later recovering parasites from the vector blood
  - D. Recovery of antibodies from the body of the host
  - E. Repeated microscopy at intervals to identify developing parasite stages from the blood of the host
- v. Artemether-lumefantrine (AL) is the drug of choice used to treat patients with uncomplicated malaria in Swaziland. The reason AL is preferred from other drugs is because:
- A. AL is provided free due to donor organizations that pay for the cost of purchase and transport to the country
  - B. AL has less side effects and can be used to treat children, adults and pregnant women
  - C. AL is the only drug that is able to destroy gametocytes, the malaria infective stages from the bodies of infected humans
  - D. AL delays development of parasites resistant to the two partner drugs
  - E. AL is the cheapest of all the double combination malaria therapies
- vi. The degree of damage caused by parasites on the host depends on all of the following except:
- A. Whether exposure is single or repeated
  - B. The immune tolerance level of the host
  - C. The site where parasites have been inoculated into the body of the host
  - D. The potential virulence level of the parasite
  - E. Whether the parasite can cause physical/mechanical damage to the host or not
- vii. A laboratory technologist identifies the following egg during routine analysis of the stool of a child.



- 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. Which one of the parasites below is diagnosed through identification of its mega- and micronuclei?

- A. *Giardia lamblia*
- B. *Cryptosporidium parvum*
- C. *Entamoeba histolytica*
- D. *Balantidium coli*
- E. *Toxoplasma gondii*

- ix. *Fasciola hepatica* parasites cause damage to the host through:
- A. Lytic or enzymatic mechanisms
  - B. Loss of large amounts of water leading to dehydration
  - C. Large numbers of worms utilising nutrients in the host leading to malnutrition
  - D. Blockage of bile ducts of the liver tissues by large worms
  - E. Causing immunosuppression of the host followed by opportunistic infections
- x. Toxoplasmosis diagnosis among patients with acute primary infection is often achieved through determination of levels of IgM and IgG antibodies against *Toxoplasma gondii* in the blood of pregnant women. Which one of the statements below confirms acute primary infection with *Toxoplasma gondii* in pregnant women?
- A. High IgG and IgM levels
  - B. Low IgG and IgM levels
  - C. High IgG and low IgM levels
  - D. Low IgG and high IgG levels
  - E. None of the above is true
- b. To indicate your response to the items in this question chose and write down the parasite described in each statement among those provided below: (5)

*Giardia lamblia*, *Entamoeba histolytica*, *Trypanosoma rhodesiense*, *Plasmodium vivax*, *Ancylostoma duodenale*, *Cryptosporidium parvum*, *Enterobius vermicularis*, *Balantidium coli*.

- i. A flagellated protozoan parasite of the bloodstream and tissues of mammals including humans
- ii. A parasite of the bloodstream of humans only not other animals
- iii. A gastro-intestinal parasite with no apparatus of locomotion and commonly causing symptoms among immunocompromised adults
- iv. A flagellated protozoan parasite of the gastro-intestinal tract of humans and other mammals
- v. A gastro-intestinal parasite that is often associated with anaemia in children

## QUESTION 2

- a. *Schistosoma haematobium* is a facultative parasite while *Trichomonas vaginalis* is an obligate parasite.
- i. What is the difference between facultative and obligate parasites? (2)
  - ii. Which one of the two, facultative or obligate parasite, are difficult to control? Give a reason for your answer. (3)

- iii. *Schistosoma haematobium* infections are sometimes suspected when patients report with haematuria. Explain the pathogenesis that results in haematuria. (3)
- iv. Trichomoniasis patients commonly report urethral discharge as the predominant symptom. Explain the pathogenesis that leads to urethral discharge. (3)
- v. Name one drug you would prescribe for a patient with schistosomiasis haematobium and one drug for a patient with trichomoniasis. (2)
- vi. Trichomoniasis is easily transmissible from men to women that vice versa. Give reasons for the difference. (4)
- b. Discuss TWO community strategies you would recommend for reduction and control of trichomoniasis infections. (4)
- c. Discuss TWO strategies you may implement at community level to reduce or control schistosomiasis haematobium infections. (4)

[25 marks]

**QUESTION 3**

- a. Malaria parasites result in almost 230 million infections and about 800 000 deaths per year throughout the world. Describe FOUR methods humans may acquire infection with malaria parasites. (8)
- b. Describe the reproductive cycle of the malaria parasites under the following headings:
  - i. Exo-erythrocytic cycle (3)
  - ii. Erythrocytic cycle (2)
  - iii. Sexual reproduction (2)
  - iv. Sporogonic cycle (3)
- c. Several cycles of the erythrocytic cycle result in a malaria victim suffering from malaria attacks. Explain what causes the malaria attacks. (5)
- d. What strategy would you suggest to residents of a malaria endemic area with high vector populations to implement in order to reduce malaria fatalities? (2)

[25 marks]

**QUESTION 4**

- a. *Ascaris lumbricoides* is a parasite of the gastrointestinal tract while *Toxoplasma gondii* is a parasite of the bloodstream.
  - i. Explain why *A. lumbricoides* is also referred to as a soil-transmitted parasite. (3)
  - ii. Describe how children commonly acquire infections with *A. lumbricoides*. (2)
  - iii. Describe THREE methods by which humans acquire infections with *Toxoplasma gondii*. (3)
- b. *Ascaris lumbricoides* control and elimination may be achieved through mass drug administration of all children in a country.
  - i. Explain why mass drug administration programmes aimed at controlling and eliminating *A. lumbricoides* commonly target children? (2)
  - ii. Explain why mass drug administration can be a useful strategy in reducing infections with *Ascaris lumbricoides*. (3)

- iii. Explain why elimination of *A. lumbricoides* infections would be difficult to achieve with mass drug administration as the sole strategy. (2)
- c. Describe THREE community initiatives you would recommend to reduce incidence of *Ascaris lumbricoides* besides mass drug administration. (6)
- d. Describe TWO strategies you would recommend to reduce infections with *Toxoplasma gondii*. (4)

[25 marks]

**QUESTION 5**

- a. *Fasciola hepatica* and *Fasciola gigantica* infect both humans and cattle resulting in illness and economic losses.
  - i. What economic losses are associated with fascioliasis? (2)
  - ii. What is the usual site where adult worms of *Fasciola hepatica* parasites are located in the body of the human host? (1)
  - iii. What is the common method used to confirm infection with fascioliasis in man? (3)
  - iv. What drug would you recommend for the successful treatment of a patient infected with *F. hepatica*? (1)
- b. Bovine carcasses are routinely inspected to identify *Fasciola hepatica* infection and prevent ingestion of adult worms by humans.
  - i. Describe the process of inspection of bovine carcasses engaged to determine infection with *Fasciola hepatica*. (3)
  - ii. If a bovine carcasses is found to be infected, can it result in transmission of parasites to the human host following ingestion of raw or undercooked infected bovine carcass? (3)
  - iii. What is spurious fascioliasis and how can it be ruled out during diagnosis of patients? (4)
- c. Discuss FOUR community initiatives you would implement to reduce fascioliasis infections and disease. (8)

[25 marks]

**QUESTION 6**

- a. Two parasites are involved in hookworm disease in Africa. Name the two parasites. (2)
- b. Explain why these parasites are commonly known as "hookworms". (2)
- c. Explain how people commonly acquire infection with these parasites. (3)
- d. Describe briefly the route followed by hookworms in bodies of infected individuals from infection until eggs of adult worms pass out in faeces. (5)
- e. Hookworm infection commonly results in ground itch or pruritus and iron deficiency anaemia in infected children.
  - i. What is the cause of the ground itch? (2)
  - ii. Explain the pathogenesis that leads to iron deficiency anaemia among infected children. (4)
- f. Name one drug commonly used to de-worm children infected with hookworms (1)
- g. Describe THREE community initiatives, other than routine de-worming, you would implement to control and eliminate hookworm disease in children. (6)

[25 marks]