



UNIVERSITY OF SWAZILAND

Faculty of Health Sciences
Department of Environmental Health Science

DEGREE IN BACHELOR OF SCIENCE IN NURSING AND
MIDWIFERY

RE-SIT EXAMINATION PAPER JULY 2017

- TITLE OF PAPER : INTRODUCTION TO PARASITOLOGY
- COURSE CODE : GNS 104
- DURATION : 2 HOURS
- MARKS : 100
- INSTRUCTIONS :
- : READ THE QUESTIONS & INSTRUCTIONS CAREFULLY
 - : **QUESTION ONE IS COMPULSORY, THEN ANSWER ANY OTHER THREE QUESTIONS**
 - : EACH QUESTION **CARRIES 25** MARKS.
 - : WRITE NEATLY & CLEARLY
 - : NO PAPER SHOULD BE BROUGHT INTO THE EXAMINATION ROOM.
 - : BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.

DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED BY THE INVIGILATOR.

QUESTION 1: COMPULSORY [All students must answer this question]

a. **MULTIPLE CHOICE:** Indicate your response to the items in this question by writing down the letter corresponding to your chosen answer. (20)

i. The key morphological features used to differentiate *Giardia lamblia* from *Plasmodium falciparum* is that:

- A. *Giardia lamblia* possesses flagella for movement while *Plasmodium falciparum* has not apparatus for locomotion
- B. *Giardia lamblia* is a parasite of the gastro-intestinal tract while *Plasmodium falciparum* is a parasite of the bloodstream
- C. *Giardia lamblia* reproduces only by binary fission while *Plasmodium falciparum* reproduces by both sexually and asexually (binary fission)
- D. *Plasmodium falciparum* is transmitted through the bite of an arthropod vector (mosquito) while *Giardia lamblia* is not transmitted by a vector
- E. All of the above

ii. Which one of the following statements about *Cryptosporidium parvum* is NOT true?

- A. *Cryptosporidium parvum* has no apparatus for locomotion
- B. *Cryptosporidium parvum* reproduces both by sexual and asexual methods inside enterocytes of infected hosts
- C. *Cryptosporidium parvum* may cause diarrhoea among infected persons
- D. *Cryptosporidium parvum* symptoms only show symptoms in patients with concurrent immunosuppression
- E. *Cryptosporidium parvum* results in production of both thick and thin-walled oocysts during reproduction

iii. Shown below are nuclei of different amoebae recovered from the faeces of an infected host.



Which of the nuclei is from *Entamoeba histolytica*?

iv. A patient infected with *Giardia lamblia* may show deficiencies of which of the following?

- A. Vitamin B₁₂
- B. Fats
- C. Sugars
- D. peptide hydrolase dehydrogenase activity
- E. All of the above

v. Which of the following interventions is likely to result in reduced malaria incidence in a community?

- A. Crushing of cans and artificial containers to prevent *Anopheles* breeding
- B. Draining of ponds, water paddles, slow-moving streams, and swamps

- C. Reduction of water habitats polluted by pesticides applied to kill pests
 - D. Slicing of old tyres to prevent water collection inside
 - E. All of the above
- vi. The parasite shown below was recovered from an infected human host.



From what medium was the parasite likely to have been recovered?

- A. Faeces
 - B. Blood
 - C. Cerebrospinal fluid
 - D. Urine
 - E. Lymph fluid
- vii. The egg stage shown below was recovered from the faeces of a child. Name the species of the parasite that produced the egg.



- A. *Ascaris lumbricoides*
 - B. *Schistosoma japonicum*
 - C. *Necator americanus*
 - D. *Trichuris trichiura*
 - E. *Strongyloides stercoralis*
- viii. The key morphological differences between *Fasciola hepatica* and *Ascaris lumbricoides* is that:
- A. The body of *Fasciola hepatica* is dorso-ventrally flattened while *Ascaris lumbricoides* has a cylindrical body
 - B. *Fasciola hepatica* has an unsegmented body while the body of *Ascaris lumbricoides* is segmented
 - C. *Fasciola hepatica* has a segmented body while the body of *Ascaris lumbricoides* is unsegmented
 - D. *Fasciola hepatica* have separate sexes (dioecious) while *Ascaris lumbricoides* have male and female reproductive organs in the same worm (hermaphrodite)
 - E. Both A and C

- ix. The egg shown below is recovered from a patient.



The attending medical officer is likely to conclude that the patient is infected with:

- A. *Ascaris lumbricoides*
 - B. *Schistosoma mansoni*
 - C. *Schistosoma japonicum*
 - D. *Schistosoma haematobium*
 - E. *Ancylostoma duodenale*
- x. Which one of the following statements about *Ancylostoma duodenale* and *Necator americanus* is NOT true?
- A. *Ancylostoma duodenale* occurs in Sub-Saharan Africa while *Necator americanus* occurs only in Central and South America
 - B. *Necator americanus* is shorter and more slender than *Ancylostoma duodenale*.
 - C. Both *Ancylostoma duodenale* and *Necator americanus* commonly cause infection in man through skin penetration of filariform larvae.
 - D. The egg stage of *Ancylostoma duodenale* is morphologically similar to that of *Necator americanus*
 - E. Both *Ancylostoma duodenale* and *Necator americanus* adults may be found in the jejunum, duodenum, ileum or stomach of infected hosts.
- b. **TRUE OR FALSE:** Write **T** (for True) or **F** (for False) against each of the statements below to indicate your response. (5)
- i. All nematode parasitic worms consist of unsegmented bodies.
 - ii. The predominant species of malaria parasite responsible for disease in all endemic countries in the world is *Plasmodium falciparum*.
 - iii. Rapid Diagnostic Tests (RDTs) are used in many facilities to confirm infection with malaria parasites because they are more sensitive than microscopy.
 - iv. *Ascaris lumbricoides* worms are unlikely to increase the number of worms in the intestines of an infected host if exposure is single.
 - v. Flukes require two intermediate hosts in their life cycle but blood flukes require only one
- [25 marks]**

QUESTION 2

- a. Giardiasis commonly results in sudden onset of watery diarrhoea with no blood or mucus among infected children leading to dehydration and death.
- i. What causes the diarrhoea among patients infected with *Giardia lamblia*? (5)
 - ii. Why is blood and mucus rare in the faeces of patients of giardiasis? (2)
 - iii. Explain how children acquire infection with *Giardia lamblia*. (2)
 - iv. Giardiasis is sometimes referred to as "traveller's diarrhoea". Why is the disease called so? (4)
 - v. Name one drug recommended for by the World Health Organisation for the successful treatment of giardiasis. (1)
 - vi. Discuss three measures that your department of Environmental Health may initiate at a community with high incidence of giardiasis to reduce the disease. (6)
- b. *Entamoeba histolytica* cysts are commonly found in faeces of humans infected with *Entamoeba coli*.
- i. What is the epidemiologic importance of finding *Entamoeba coli* in persons that are not infected with *Entamoeba histolytica*? (3)
 - ii. Describe ONE feature commonly used by laboratory technicians to differentiate cysts of *Entamoeba histolytica* from those of *Entamoeba coli*. (2)

[25 marks]

QUESTION 3

The parasites shown below were identified by microscopy inside the red blood cells of a woman in the third trimester of pregnancy by a laboratory technologist working at Good Shepherd Hospital.



- a. What parasite species may have infected the patient? Give a reason for your answer.(3)
- b. Why was it important for the attending medical officer to establish that the patient was in the third trimester of pregnancy? (3)
- c. Give THREE reasons why this species of malaria parasite is more deadly than other species. (6)
- d. Name the drug(s) the medical officer is likely to prescribe to the patient. Give reasons for the choice of drugs suggested. (6)

- e. The medical officer issues the pregnant woman with an insecticide treated net and advises that she sleeps under the net with the child in order to enhance protection from repeated infection with malaria. How does the insecticide treated net protect the child from malaria? (5)
- f. Why was the woman not protected using intermittent prophylaxis with sulphadoxine-pyrimethamine as soon as it was discovered that she was pregnant? (2)

[25 marks]

QUESTION 4

- a. The Subclass Coccidia consist of organisms that lack any apparatus of movement. Explain why *Toxoplasma gondii* is sometimes not classified with this group despite that *T. gondii* also has no apparatus for locomotion. (2)
- b. Explain why *T. gondii* is often not classified in the same Class as Plasmodia despite that both parasites lack apparatus for locomotion. (2)
- c. *Toxoplasma gondii* parasites exist in two stages inside the body of infected human hosts. Name the two stages and the condition of the hosts in which each stage occurs. (4)
- d. Explain why it is more important to prevent toxoplasmosis infection in pregnant women than in non-pregnant women. (3)
- e. List FOUR ways by which humans acquire infection with *Toxoplasma gondii*. (6)
- f. Two drugs are used to successfully treat humans infected with toxoplasmosis. Name the drugs. (2)
- g. Describe THREE interventions you may initiate to reduce infections and symptomatic toxoplasmosis in a community. (6)

[25 marks]

QUESTION 5

- a. Flukes form developmental stages in second intermediate hosts following escape from the primary intermediate host. What is the primary host of flukes? (1)
- b. Write down ONE second intermediate host of each of the following flukes: (3)
- Fasciola hepatica*
 - Fasciolopsis buski*
 - Paragonimus westermani*
- c. What are the common names of the following flukes of man? (3)
- Fasciola hepatica*
 - Fasciolopsis buski*
 - Paragonimus westermani*
- d. Describe briefly the symptoms that would lead to suspicion of infection with the following fluke diseases: (3)
- fascioliasis

- ii. paragonimiasis (3)
- e. *Fasciola hepatica* and *F. gigantica* are common flukes found infecting cattle in Swaziland. How do cattle acquire infection with these flukes? (2)
- f. *Fasciola hepatica* and *F. gigantica* eggs are often identified during routine analysis of the faeces of humans. Does finding of these all eggs always suggest danger of the human hosts in which they are recovered? Give a reason for your answer. (3)
- g. Describe FOUR interventions you may initiate at a community with high human and cattle *F. hepatica* infections to reduce incidence of human fascioliasis. (7)

[25 marks]

QUESTION 6

- a. Give FOUR characteristics of the members of the Class Nematoda that distinguish them from other members of the Sub-Kingdom Metazoa. (4)
- b. Discuss the typical composition of the reproductive system of members of the Class Nematoda, showing clear contrasting features with other members of other Metazoan parasites. (4)
- c. A typical nematode, *Ascaris lumbricoides*, is a common parasite of children in tropical and sub-tropical areas of rural sub-Saharan Africa.
 - i. Explain why *Ascaris lumbricoides* infections are more common in children than adults? (4)
 - ii. Explain why *Ascaris lumbricoides* is common in tropical and sub-tropical climates as opposed to temperate climates? (2)
 - iii. Give TWO reasons why *Ascaris lumbricoides* is more common in rural areas in sub-Saharan Africa. (4)
- d. Explain what causes tropical pulmonary pneumonia (Löffler's syndrome) and cyanosis (blueness of skin) among children infected with *Ascaris lumbricoides*. (3)
- e. High prevalence rates of *Ascaris lumbricoides* among children may be reduced through mass treatment or chemotherapy. Explain how mass treatment is effective in reducing prevalence of infection among children. (4)

[25 marks]