UNIVERSITY OF SWAZILAND

FACULTY OF HEALTH SCIENCES

MAIN EXAMINATION PAPER – DECEMBER, 2014

TITLE OF PAPER	:	INTRODUCTION TO PARASITOLOGY
COURSE CODE	:	HSC 104
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

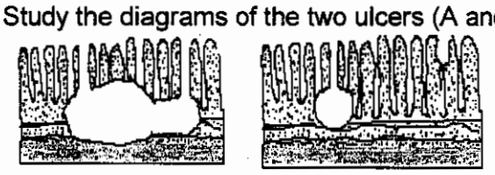
This question paper consists of 7 printed pages including this one

QUESTION 1

a. Write down the letter corresponding to your chosen response to each of the items in this question. (20)

i. A parasite is recovered from the gut of a 3-year old child and found to have ingested red blood cells. The parasite is likely to be:
   A. *Giardia lamblia*
   B. *Balantidium coli*
   C. *Cryptosporidium parvum*
   D. *Isospora belli*
   E. *None of the above*

ii. Study the diagrams of the two ulcers (A and B) shown below:



The ulcers are due to:
   A. *Entamoeba histolytica* and *Balantidium coli*, respectively
   B. *Balantidium coli* and *Entamoeba histolytica*, respectively
   C. Both *Entamoeba histolytica*
   D. both *Balantidium coli*
   E. neither *Entamoeba histolytica* nor *Balantidium co*

iii. Which of the diseases below can be adequately prevented by treatment of water supplies and sanitary disposal of faecal matter?
   A. giardiasis
   B. amoebiasis
   C. schistosomiasis
   D. ascariasis
   E. All of the above

iv. A laboratory technologist examines the stool of a four-year old child infected with amoebiasis. He identifies a trophozoite and closely examines the nucleus to determine if it is that of *Entamoeba histolytica*. Which one of the nuclei below is likely to be that of *E. histolytica*?

A B C D E

v. Which one the antimalarial drugs below has the ability kill young gametocyte stage parasites?
   A. Artemether-lumefantrine
   B. chloroquine
   C. quinine
   D. primaquine
   E. mefloquine

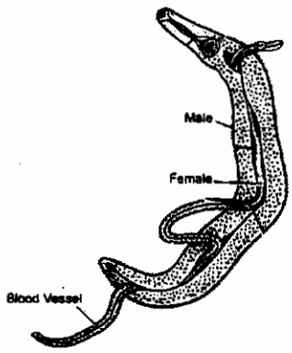
vi. Which one of the following malaria control strategies is NOT used by the National Malaria Control Programme in Swaziland?
   A. Intermittent preventive therapy with sulphadoxine-pyrimethamine in pregnant women and children
   B. Indoor residual spraying of human dwellings with pyrithroid-based insecticides
   C. Distribution and promotion of use of insecticide treated bednets
   D. Promotion of uptake of chemoprophylactic drugs by people intending to visit malaria endemic areas outside the country
   E. Prompt identification and treatment of cases with effective antimalarial drugs to reduce sources of infection for mosquitoes

vii. Study the diagram of the parasite shown below:

Where do you think this parasite might have been recovered?
   A. From the proventriculus and foregut of the tsetsefly
   B. From the salivary glands of the tsetsefly
   C. From the bloodstream of a mammalian host
   D. From the lymph nodes of a mammalian host
   E. Both C and D

viii. When performing diagnosis of infection with a variety of helminthes why is it important to perform an egg count?
   A. Eggs and not adult worms exist in the body of the infected human host and counting the eggs determines how much medication will be needed to remove the eggs
   B. Egg counts are performed in order to calculate the average number in different stool or urine samples
   C. The number of eggs can be converted to determine the degree of infection
   D. Egg counts are performed because the patient is infected through ingestion of eggs in most helminthes infections
   E. The number of eggs in the body of the human host is exactly equal to the number of adult helminthes existing inside

ix. The parasites below might have been obtained from:



A. urine
B. the urinary system of infected host
C. urinary discharge
D. bloodstream
E. lymph node fluid

x. Which group of symptoms among those listed below is associated with lymphatic filariasis infection?
A. Subcutaneous nodules, dermatitis, sclerotizing keratitis leading to blindness
B. Lymphadenitis, lymphangitis, hydrocele, elephantiasis of arms, legs, genitalia or breasts
C. Pruritus, urticarial and creeping eruptions, prickly sensation that may lead to Callabar swelling
D. Inflammation and granuloma formation in the liver, atrophy of hepatic cells, wheezing cough, cryptic eruption of the skin
E. Both A and B

b. Write **T** (for true) or **F** (for false) in each of the statements below: (5)
i. Recently evolved parasites are likely to be more virulent to their hosts and cause a lot of damage than old parasites.
ii. In a commensal relationship both the parasite and the host benefit but none is harmed
iii. All members of the Cestoda class lack a digestive tract at any stage of their life cycle
iv. *Entamoeba histolytica*trophozoites sometimes enter into damage wounds created by *Trichuris trichiura* worms.
v. Thick-blood smears are good for the determination of infecting malaria species during diagnosis.

[25 marks]

QUESTION 2

a. Read carefully the symptoms listed below and write down the disease the patient is likely to be suffering from: (5)
   i. Chronic vaginitis, valvo-vaginal irritation, pruritus and a yellowish, frothy discharge
   ii. Mild to profuse watery diarrhoea in immunocompromised patients, vomiting, weight loss, crypt hyperplasia and blunting of villi
   iii. Headache, joint pains, popular skin rash, generalized lymphadenopathy, weight loss, insomnia, abnormal reflexes
   iv. Sudden onset of watery, frothy diarrhoea, upper abdominal discomfort, intestinal gurgling and increased foul flatus
   v. Chronic cough, occasional passing of rusty or bloodstreaked sputum, vague chest pains, periodic haemoptysis
b. Explain the cause of each of the following symptoms of trichomoniasis:
   i. Urethral discharge in man (2)
   ii. Strawberry cervix in females (3)
c. Discuss the relationship between infection with the Human Immunodeficiency Virus (HIV) that causes AIDS and trichomoniasis. (4)
d. Explain how neonatal infection with trichomoniasis occur. (2)
e. Name one drug you would prescribe to effectively treat trichominiasis infection. (1)
f. Discuss strategies you may put in place to prevent neonatal infection with *Trichomonas vaginalis*. (4)
g. Discuss TWO community strategies you may use to reduce incidence of trichomoniasis. (4)

[25 marks]

QUESTION 3

a. Malaria parasites reproduce in man and in an arthropod vector, the female mosquito.
   i. Name the two sites in which malaria parasites multiply in the bodies of humans.(2)
   ii. Name the two sites in which malaria parasites multiply in the bodies of *Anopheles* mosquitoes, each time mentioning the resultant stage of the parasite. (4)
b. Explain why female mosquitoes are involved in malaria transmission and not male mosquitoes. (3)
c. Discuss briefly the symptoms that would lead to a healthcare worker suspecting infection with malaria parasites in a patient. (3)
d. Patients diagnosed with uncomplicated malaria are treated with artemether-lumefantrine in Swaziland following recommendation of the drug by the World Health Organization (WHO).
   i. Why is it an advantage to treat malaria with a drug such as artemether-lumefantrine? (3)
   ii. Recently, the WHO recommended addition of 0.25mg of Primaquine to the treatment regimen of artemether-lumefantrine. What is the advantage of adding primaquine? (2)

e. Long term efforts to reduce malaria transmission often target reduction of populations of the mosquito vector. Discuss two strategies malaria control programmes may use to reduce mosquito populations. (4)

f. The Swaziland National Malaria Control Programme has, since 2003, distributed insecticide treated bednets among pregnant women and children to reduce morbidity and mortality in these groups. Discuss FOUR methods through which insecticide treated nets can reduce malaria incidence. (4)

[25 marks]

QUESTION 4

a. Schistosomes belong to the Class Trematoda but there are essential differences in the reproductive cycles with those of other members of the class Trematoda. Discuss TWO differences in the reproductive cycle of Schistosomes and those of other Trematodes. (4)

b. Name two schistosomesthat commonly cause disease among children, showing clearly the body organ parasitized by each. (4)

c. Describe the human practices that result in the increase of the presence of schistosome parasites in many rivers in Swaziland. (4)

d. Describe briefly the symptoms associated with the two species of schistosomes commonly responsible for disease among children in Swaziland. (5)

e. Discuss briefly the laboratory procedure that is likely to lead to confirmation of schistosomiasis infection in a child showing symptoms. (4)

f. Discuss TWO strategies you may implement among children in a community to reduce the incidence of schistosomiasis. (4)

[25 marks]

QUESTION 5

a. Both *Entamoeba histolytica* and *Balantidium coli* cause intestinal ulcers in infected humans.

   i. Explain how you may differentiate between the ulcers caused by the two parasites. (4)

   ii. Describe the mechanisms caused by the two parasites during cause of ulcers. (2)

   iii. Explain how the symptoms due to the two parasites may be differentiated. (4)

b. Sometimes both *Entamoeba histolytica* and *Balantidium coli* may be recovered from intestinal ulcers by endoscopy. Explain how the recovered parasites may be differentiated structurally. (4)

c. Name ONE drug you may recommend to successfully treat each one of the two parasites. (2)

d. A majority of *B. coli* infections are acquired from animal reservoirs. How can you use this information to reduce human infections with *B. coli*. (2)

e. *E. histolytica* may be transmitted to humans mechanically by arthropods. Explain how you may use this information to reduce incidence of amoebiasis. (3)
f. Discuss TWO community interventions you may use to reduce incidence of amoebiasis. (4)

[25 marks]

QUESTION 6

a. Whipworm (*Trichuris trichiura*) infects more than 500 million people worldwide annually, most of them children.
   i. Explain why *Trichuris trichiura* is referred to as whipworm. (2)
   ii. Explain how children acquire infection with *Trichuris trichiura*. (2)
   iii. Discuss briefly the symptoms associated with trichuriasis in a child. (3)
   iv. Explain how infection with trichuriasis may be confirmed. (2)
   v. Name one drug you may recommend to successfully treat children found infected with trichuriasis. (1)
   vi. Discuss TWO community initiatives your office may engage to reduce infections with *T. trichiura* among children. (4)
b. Children heavily infected with *Ascaris lumbricoides* often show symptoms of protein deficiency and overt kwashiorkor.
   i. How do children acquire infection with *Ascaris lumbricoides*? (2)
   ii. What is the cause of the protein deficiency and overt kwashiorkor during infection with *Ascaris lumbricoides.* (2)
   iii. Name one drug you may use to successfully treat a child infected with *A. lumbricoides.* (1)
c. Discuss THREE community measures you may include in your control design to reduce incidence of both trichuriasis and ascariasis. (6)

[25 marks]