UNIVERSITY OF SWAZILAND

FACULTY OF HEALTH SCIENCES

SUPPLEMENTARY EXAMINATION PAPER – JULY, 2014

TITLE OF PAPER	:	INTRODUCTION TO PARASITOLOGY
COURSE CODE	:	HSC 104
TIME	:	2 HOURS
MARKS	:	80

INSTRUCTIONS	:	ANSWER **QUESTION 1** AND **ANY THREE** OTHER QUESTIONS
	:	EACH QUESTION CARRIES 20 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 8 printed pages including this one

QUESTION 1 MULTIPLE CHOICE

Write the letter that corresponds to your chosen answer among those suggested for each sub-question e.g. xv. D

i. Which one of the organisms below is single-celled?
   A. *Ascaris lumbricoides*
   B. *Necator americanus*
   C. *Trichuris trichiura*
   D. *Balantidium coli*
   E. *Enterobius vermicularis*

ii. Parthenogenesis is a type of reproduction associated with
   A. *Ascaris lumbricoides*
   B. *Toxoplasma gondii*
   C. *Strongyloides stercoralis*
   D. *Balantidium coli*
   E. *Enterobius vermicularis*

iii. Which one of the statements below about *Toxoplasma gondii* infection is true?
   A. Positive serologic tests showing high and rising IgG and IgM antibodies suggest an acute primary infection
   B. Positive serologic tests showing high and rising IgG and IgM antibodies suggest a latent infection in immunocompetent individuals
   C. The risk of acquiring infection is similar in all groups of people
   D. *Toxoplasma gondii* infections occur equally in all geographic regions of the world where there are cats
   E. *Toxoplasma gondii* infection causes serious disease or death in all people because it affects the central nervous system

iv. Which one of the following mosquito breeding areas is associated with increased malaria incidence?
   A. Car tyres
   B. Cans
   C. Ponds
   D. Rice fields
   E. Muddy hoof-prints

v. A young girl reports to a health facility with complaints of recurrent bouts of diarrhoea and dysentery with blood stained mucus. A stool examination is performed and the parasite below is recovered:

Which of the statements below would be the best suggestion concerning the diagnosis of the girl?

A. The girl is only infected with a non-pathogenic amoeba
B. The girl may be infected with *Giardia lamblia*
C. The girl may be infected with *Entamoeba histolytica*
D. The amoeba above is responsible for the symptoms observed in the girl
E. The girl may be infected with *Balantidium coli*

vi. An 18-year old boy reports to a health facility with complaints of urethral discharge, pain on urination and coitus and urethral pruritus. The boy is infected with:

A. *Enterobius vermicularis*
B. *Schistosoma haematobium*
C. *Trichomonas vaginalis*
D. *Entamoeba histolytica*
E. *Necator americanus*

vii. An adult man of 49 years reports to a health facility with complaints of watery diarrhoea and weight loss. Upon stool examination, the parasite stage below is identified.

What conclusions can be made about the man's infection?

A. The man is likely to be infected with both HIV and isosporiasis
B. The man is likely to be infected with both HIV and toxoplasmosis
C. The man could have a low CD4 cell count and is infected with cryptosporidiosis
D. The man is likely to have a normal CD4 cell count and might be infected with cryptosporidiosis
E. The man is likely to have a normal CD4 cell count and might be infected by both HIV and isosporiasis

viii. A resident of Mbabane intends visiting KwaZulu-Natal, a malaria endemic area in South Africa. In fear that he might contract malaria, he consults your advice and you recommend chemoprophylaxis prior to departure. Which of the following drugs would you recommend he uses?

A. Artemether-lumefantrine
B. Quinine
C. Mefloquine
D. Artemisinin-amodiaquine
E. Dihydroartemisinin piperaquine

ix. Which one of the following IS NOT a method of differentiating *Taenia solium* from *Trichuris trichiura*?

A. *Taenia solium* is hermaphroditic while *Trichuris trichiura* is dioecious
B. *Taenia solium* is segmented while *Trichuris trichiura* is unsegmented
C. *Taenia solium* has no body cavity while *Trichuris trichiura* has a body cavity
D. *Taenia solium* is oviparous while *Trichuris trichiura* is larviparous
E. *Taenia solium* has a dorso-ventrally flattened body while *Trichuris trichiura* has a cylindrical body

x. Blood is drawn at night from a young boy from a country in West Africa. Upon microscopic examination, the part of the parasite shown below is identified.
The boy is likely to be infected with:

A. *Wuchereria banchrofti*
B. *Brugia malayi*
C. *Brugia timori*
D. *Onchocerca volvulus*
E. *Loa loa*

[20 marks]

QUESTION 2

a. Write **T** (for true) and **F** (for false) in each of the statements below: (5)
   i. Cryptosporidia do not penetrate or enter the epithelial cells during multiplication
   ii. Worms do not multiply inside the body of an infected human host.
   iii. Trematodes attach through hooks on the tissues of the infected host
   iv. During infection with *Giardia lamblia*, trophozoites are passed out and may enter water sources leading to infections of hosts
   v. *Entamoeba dispar* often coexists with *Entamoeba histolytica* in the same host resulting in more severe ulceration

b. *Entamoeba histolytica* infection may cause ulceration of intestinal linings of infected individuals.
   i. Explain how *Entamoeba histolytica* cause ulceration of intestinal linings of infected individuals. (3)
   ii. What method of diagnosis would you recommend to confirm infection with amoebiasis? (3)
   iii. Explain how you would identify the trophozoite of *Entamoeba histolytica* from that of other non-pathogenic species of amoebae. (2)
   iv. What is the effect of the pathogenicity of *Entamoeba histolytica* as a result of co-infection with the Human Immunodeficiency Virus (HIV) with significantly reduced CD4 cell count? (3)
   v. Discuss two pieces of advice you would give to an HIV-infected individual infected with amoebiasis to prevent re-infection and severity of the disease. (4)

[20 marks]

QUESTION 3

Malaria in Swaziland has decreased by more than 90% in the last decade or so partly because of robust strategies implemented by the National Malaria Control Programme (NMCP).

a. List and explain FOUR strategies utilised by the NMCP to result in reduced incidence of the disease in the country. (8)
b. Name the species most commonly responsible for infections in the country. (1)
c. Explain why this species is often involved in severe disease or death of those infected. (6)
d. Discuss TWO strategies you think the NMCP should prioritise once the disease has been eliminated in the country. (5)

[20 marks]

QUESTION 4

a. Taeniasis solium adult worm infections are often associated with infection with the larval stage of Taenia solium.

i. What is the larval stage of Taenia solium called? (1)

ii. How does infection with larval stage of Taenia solium occur? (2)

iii. Name one drug you would recommend for successful treatment of infection with larvae of Taenia solium. (1)

iv. In order to reduce infection with the more serious larval infection, certain measures should be implemented in communities to reduce prevalence of adult Taenia solium infections. Discuss TWO pieces of advice you may give to a community to reduce prevalence of adult Taenia solium infections. (4)

b. A two-year old child visits family friends in Taiwan Republic of China. Upon return, the child shows with abdominal discomfort and mild diarrhoea, megaloblastic anaemia resembling pernicious anaemia but with little pathologic damage. Upon examination of the faeces of the child, the following parts of a parasite are recovered:

i. What parasite is the child likely to be infected with? (1)

ii. How do you think the child acquired the infection? (2)

iii. How did the disclosure that the child visited Taiwan help in the diagnosis of the child? (2)

iv. What is the cause of the megaloblastic anaemia in the child? (2)

v. What treatment(s) would you recommend for the child to completely relieve symptoms associated with this infection? (3)

vi. What advice would you give to the parents of the child to prevent future infections with the same parasite among their children's future visits to Taiwan? (2)

[20 marks]

QUESTION 5

a. For each of the statements on the left column below, match with the corresponding parasite on the right hand column by writing the number and the corresponding roman numeral e.g. 7-ix. (5)

1. may perforate intestines resulting in dysentery, diarrhoea with mucus and blood	*i. Trichomonas vaginalis*
2. commonly affects individuals with reduced CD4 cell count as a result of HIV infection	*ii. Giardia lamblia*
3. may cause brain lesions, lymphadenopathy, delayed sensation to pain, weight loss and disturbed sleep pattern	*iii. Entamoeba histolytica*
4. trophozoites in vaginal or urethral secretions and urine; do not survive well in the environment	*iv. Trypanosoma rhodesiense*
5. excysts in the duodenum and begin active longitudinal division that results in sudden, explosive and often severe diarrhoea leading to weight loss and dehydration	*v. Cryptosporidium parvum*

b. An 11-year old herd-boy reports to a health facility with complaints of dermatitis, pruritic erythematous eruptions on one foot. Upon further questioning, the boy also reveals to have experienced transient episodes of coughing, fever and expectoration of blood tinged sputum.

i. What laboratory procedure would you recommend to confirm the species of parasite infecting the boy? (3)

ii. What species do you think is likely to be revealed by this laboratory procedure? (1)

iii. How do you think the boy could have acquired the infection? (3)

iv. What explanation would you give to the parents of the boy for the coughing and blood-tinged sputum? (2)

v. What other condition would you assess in the boy as a result of this infection prior to making a prescription? (2)

vi. Suppose the condition mentioned in (iv) is confirmed, make an adequate prescription to successfully treat the boy of the infection and the condition. (2)

vii. Mention ONE piece of advice you may give to the boy to prevent future infection with this parasite. (2)

[20 marks]

QUESTION 6

a. A one-year old child comes to a health facility with complaints of skin rash, hepatomegaly, retinochoroiditis, pneumonitis, jaundice, convulsions, hydrocephalus, intracranial calcifications and mental retardation, some of which were observed from birth.
   i. Describe a preliminary serologic test that would suggest the infecting parasite. (2)
   ii. What laboratory procedure would you suggest to confirm the infecting species. (2)
   iii. List three possible ways by which the child may have acquired the infection. (3)
   iv. Name the drug(s) you would suggest for successful treatment of this child. (2)
   v. Besides treating the infecting species, what other health condition would you suggest be established in order to adequately and effectively treat the child. (2)
   vi. What measures would you suggest to the parents of the child to prevent other children acquiring infection with this parasite in the future. (3)

b. A pregnant woman is found infected with *Trichomonas vaginalis*. Further laboratory investigations confirm that the foetus is infected with the Human Immunodeficiency Virus (HIV).
   i. What symptoms may appear in the newborn to suggest infection with the parasite? (2)
   ii. What effect would HIV infection have on the child? (2)
   iii. Discuss a management strategy you would suggest for the newborn who is found infected with both *Trichomonas vaginalis* and HIV? (2)

[20 marks]