UNIVERSITY OF SWAZILAND

FACULTY OF HEALTH SCIENCES

FINAL EXAMINATION PAPER – DECEMBER, 2010

TITLE OF PAPER	:	VECTOR AND VERMIN CONTROL
COURSE CODE	:	EHS 214
TIME	:	2 HOURS
MARKS	:	100

INSTRUCTIONS	:	ANSWER **QUESTION 1** AND **FOUR** OTHERS
	:	**QUESTION 1** IS COMPULSORY
	:	EACH QUESTION IS 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
	:	ALL CALCULATIONS/WORK OUT DETAILS SHOULD BE SUBMITTED WITH YOUR ANSWER SHEET

ANSWER QUESTION 1 AND ANY FOUR QUESTIONS FROM THIS SECTION.

QUESTION 1 [COMPULSORY]

i. Which one of the following diseases may be transmitted by flies belonging to the family Simuliidae?
   A. Yellow fever
   B. Onchocerciasis
   C. Trypanosomiasis
   D. Murine typhus
   E. Lymphatic filariasis

ii. Which one of the following flies is larviviparous?
   A. Blackfly
   B. Horsefly
   C. Tsetsefly
   D. Sandfly
   E. Mosquito

iii. Which one of the following mites is an ectoparasite of mice?
   A. Dermanyssus gallinae
   B. Leptotrombidium akamushi
   C. Demodex folliculorum
   D. Sarcoptes scabei
   E. Allodermanyssus sanguineus

iv. Some arthropods spin a cocoon in which they pass through unfavourable environmental conditions. Which of the following arthropods spin a cocoon in their life cycles?
   A. flea
   B. tsetsefly
   C. sandfly
   D. blackfly
   E. only the flea and the blackfly

v. The abdomen of the flea consists of 10 segments. The ninth segment bears a dorsal plate called the
   A..ctenidia
   B. pronotum
   C. sensilium
   D. pygidium
   E. both C or D

vi. The midgut of an insect is also referred to as a
   A. stomodaeum
   B. proventriculus
   C. mesenteron
   D. proctodaeum
   E. crop

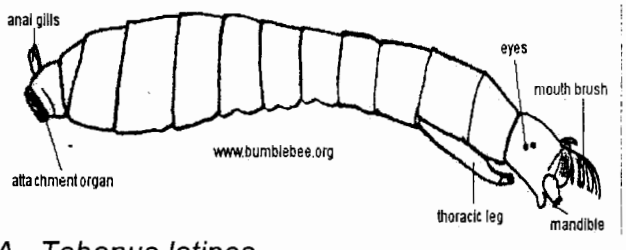
vii. Which one of the following is NOT an effect of arthropods on man?

A. Envenomation
B. Vesication
C. Urtication
D. Psychological disturbance
E. Malnutrition

viii. A malaria endemic community in the lowveld undertakes an intervention to crush and bury underground all cans that may provide as breeding habitats for mosquitoes as a means to reduce the population of malaria transmitting mosquitoes. The strategy is:

A. correct, because malaria transmitting mosquitoes breed in cans
B. incorrect, because malaria transmitting mosquitoes do not breed in cans
C. correct, because it provides a long term solutions to malaria transmission in a community
D. incorrect, because the cans become an environmental problem underground
E. incorrect, because malaria transmitting mosquitoes have many other alternative habitats besides cans in which they can breed

ix. The larval stage shown below is that of:



A. *Tabanus latipes*
B. *Phlebotomus papatasii*
C. *Chrysops dimidiata*
D. *Simulium damnosum*
E. *Glossina morsitans*

x. The degree of toxicity of an snake venom depends on the:

A. age of the person bitten
B. time of the day biting takes place
C. condition of the snake when biting takes place
D. weather of the day i.e. whether it is very cold or very hot
E. the position of the bite in the body

[20 marks]

QUESTION 2

a. Name the order and family to which the human louse, *Pediculus humanus humanus* belong. (2)

b. The respiratory system of the louse involves external structures called spiracles and paratergal plates.

   i. Discuss briefly the internal arrangement of the respiratory system of the louse beyond the spiracles. (3)

   ii. Explain the importance of the paratergal plates in the respiratory process of the louse. (2)

c. Other than disease transmission, mention 3 other effects of louse infestation on their host (human or animals). (3)

d. *Pediculus humanus humanus* is the only species of louse involved in disease transmission to humans. Diseases transmitted include epidemic (louse-borne) typhus, epidemic relapsing fever, and trench fever.

   i. For each of the diseases mentioned above, name the pathogen involved. (3)

   ii. Explain the process by which humans acquire epidemic (louse-borne) typhus from the louse vector. (3)

e. Discuss briefly one method by which infestation with the following louse species may be prevented.

   i. *Phthirus pubis* (2)

   ii. *Pediculus humanus humanus* (2)

[20 marks]

QUESTION 3

a. Cockroaches are common pests of many domestic areas, hence are referred to as "synanthropes".

   i. Explain the meaning of "synanthrope". (2)

   ii. Explain how cockroach infestation occurs initially in a domestic residence and further outline the conditions involved in establishment and spread of the infestation. (6)

   iii. Discuss the life cycle of a cockroach including areas where eggs are laid until an adult cockroach emerges. (4)

b. Because of their size and colour, cockroaches are often confused with bedbugs.

   i. Explain how, using two ways, you may differentiate between an adult cockroach and a bedbug. (4)

   ii. Mention two ways bedbug infestation may be introduced to a human dwelling unit. (2)

   iii. Mention one effect of bedbugs on humans and one on poultry. (2)

[20 marks]

QUESTION 4

a. The life cycle of the housefly involves 3 stages of ecdyses from the larval stage to the pupa stage.
   i. Mention 3 habitats preferred by the female housefly for laying its eggs. (3)
   ii. Discuss housefly reproduction (life cycle) from the pupa stage until an adult housefly emerges. (4)
   iii. What is the difference between ecdyses and moulting as applied to insect development? (4)

b. The housefly is an important mechanical transmitter of disease to man.
   i. Discuss two ways by which the housefly mechanically transmit pathogens to humans. (4)
   ii. Discuss how fly control may be maintained by reduction of breeding and through sanitary measures. (5)

[20 marks]

QUESTION 5

a. The tumbu fly is often involved in subdermal myiasis in humans in Africa.
   i. What is the technical name for tumbu fly? (1)
   ii. Explain the process by which tumbu fly causes sub-dermal myiasis in man. (4)
   iii. Explain how tumbu fly infestation in humans may be treated. (3)

b. Another fly involved in furuncular myiasis besides the tumbu fly is *Dermatobia hominis*.
   i. Write down the common name for *Dermatobia hominis*. (1)
   ii. Explain the process by which *Dermatobia hominis* cause infestations and disease manifestations in man. (6)

c. Bees, wasps, hornets and ants are often involved in severe envenomation of humans.
   i. To what order do bees, wasps and ants belong? (1)
   ii. Discuss two ways by which envenomation of a person by bee stings maybe treated. (4)

[20 marks]

QUESTION 6

a. Fleas are intermediate hosts of some tapeworms.
   i. Name the order to which fleas belong? (1)
   ii. Name 3 tapeworms that can develop in the bodies of fleas. (3)

b. Infestation with fleas may cause immediate-type reaction. Name 4 areas in the bodies of animals where reaction to flea bites may be observed. (4)

c. The flea is a good jumper, explain what characteristic make the flea well adapted for jumping. (2)

d. The life cycle of the flea involves the egg, larva, pupa and adult stages.

i. Name 3 habitats on which the flea lays its eggs. (3)

ii. Discuss briefly the appearance of the larval stage of the flea. (4)

iii. Mention 3 areas where larval stages of fleas may be found. (3)

[20 marks]

QUESTION 7

a. Name the order and suborder to which mosquitoes belong. (2)

b. What characteristics make the mosquitoes classifiable under this suborder? (3)

c. Describe the process by which you may collect larvae for sampling purposes at a swampy area in Lavumisa. (3)

d. Suppose you visit Ngcayizivele farm in Big Bend. The place is infested with Anopheles mosquitoes which are capable of transmitting malaria during blood feeding.

i. What anatomical features would you use to differentiate between adult Culicine and Anopheline mosquitoes? (4)

ii. Also, how would use landing or resting positions of adult mosquitoes to differentiate between Culicines and Anophelines. (2)

iii. Explain how you may protect yourself from bites of Anopheline mosquitoes, which have the potential to infect you with malaria, while at Ngcayizivele. Also explain clearly how the methods you describe will achieve protection from bites. (6)

[20 marks]