

UNIVERSITY OF SWAZILAND

FACULTY OF HEALTH SCIENCES

FINAL EXAMINATION PAPER – MAY 2005

- TITLE OF PAPER : VECTOR AND VERMIN CONTROL
- COURSE CODE : EHS 203
- TIME : 3 HOURS
- MARKS : 100
- INSTRUCTIONS :
- : ANSWER **FIVE** QUESTIONS IN ALL.
 - : ANSWER **QUESTION 1** AND **ANY FOUR** OTHER OF YOUR CHOICE
 - : NO FORM OF ANY PAPER SHOULD BE BROUGHT INTO NOR OUT OF THE EXAMINATION ROOM
 - : BEGIN THE ANSWER TO EACH QUESTION ON A SEPARATE SHEET OF PAPER
 - : ALL CALCULATIONS/WORKOUT DETAILS SHOULD BE SUBMITTED WITH YOUR ANSWER SHEET
 - : CALCULATORS MAY BE USED BUT THEY MUST BE THE SILENT TYPE

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

QUESTION 1 - COMPULSORY

a. MULTIPLE CHOICE

i. The characteristics of a good residual insecticide are that the residual insecticide should be :

- A. highly toxic to target insects
- B. not repellent or irritant to target insects
- C. long lasting on a given surface
- D. stable during storage and transportation, mix well with water, harmless to spraying equipment
- E. All of the above

ii. Which one of the following is NOT a desirable characteristic of a refuse container that will be effective in keeping rodents away ?

- A. Rust resistant
- B. Two handles or a bail
- C. Recess bottom
- D. Light duty construction for ease of emptying
- E. Made of material that is easy to clean

iii. Which of the following is/are NOT true about the roof rat and the Norway rat ?

- A. Norway rat – small ears, roof rat – large ears
- B. Norway rat – small eyes, roof rat – large eyes
- C. Norway rat – light and slender body, roof rat – heavy and thick body
- D. Norway rat – pointed nose, roof rat – blunt nose
- E. Both C and D

b. Examine carefully each of the statements below and write T (true) or False (F) as you deem fit.

- i. People without a net sleeping in the same room as somebody with a treated bednet receive some protection from mosquito bites.
- ii. Insecticides are always applied in their pure form.
- iii. All tsetseflies, males and females feed on blood.
- iv. The life cycle of the housefly goes through incomplete metamorphosis
- v. Cities sometimes control cockroaches on a large scale with fogs produced by thermo-fogging machines

- c. A village has 100 houses. The average surface that can be sprayed per house is 200 m^2 . The recommended dosage of DDT is 2g/m^2 . The DDT is available as a 75% water dispersible powder. Calculate the amount of DDT that is needed to be used to spray the 100 houses. (4)
- d. The following is a table of diseases transmitted to man by ticks and mites. Complete the table by writing out the missing information in i to v.

DISEASE	PATHOGEN	VECTOR
African Relapsing fever	<i>Borrelia duttoni</i>(i).....
Tick borne typhus(ii).....	<i>Dermacentor, Amblyomma, Rhipicephalus.</i>
Scrub typhus(iii).....	<i>Leptotrombidium spp.</i>
.....(iv).....	<i>Rickettsia akari</i>	<i>Trombicula sanguineus</i>
Lyme disease	<i>Borrelia burgdorferi</i>(v).....

(5)

QUESTION 2

- a. Mention three ways in which mosquitoes differ from other biting Diptera. (3)
- b. Mosquito larvae grow continuously in four different instars.
- Explain how you may identify Anopheline larvae from the other Culicine larvae. (2)
 - Describe the site from which you may look for and collect Anopheline larvae. (2)
 - Describe in detail how you may collect the larvae from the site described in (ii) above. (3)
- c. During mosquito control by chemical methods, the Malaria Control Unit in Swaziland sprays indoors of houses.
- Explain why indoor sprays are good for mosquito control. (2)
 - What chemical, other than DDT, does the Malaria Control Unit use for indoor sprays during mosquito control? (1)
- d. The Malaria Control Unit in Swaziland recently introduced bednets to control malaria.
- Explain how bednets work to control malaria transmission to humans.
 - Why are pregnant women and children given priority during bednet distribution in communities? (2)
 - Describe the procedure followed during the treatment of a bednet. (3)

[20 marks]

QUESTION 3

- a. Mention two reasons blackflies are of public health importance in Africa. (2)
- b. Eggs of blackflies are laid in fast-flowing streams, rivers or spillways of dams.
- i. Explain why the blackflies prefer fast-flowing water to lay their eggs. (2)
 - ii. Explain how the larvae that hatch from the eggs prevent being washed down by the fast flowing water. (2)
- c. Mention two methods humans may use to protect themselves from bites of blackflies whenever they visit the river. (2)
- d. Another bloodsucking arthropod that is often a nuisance in communities is the sandfly.
- i. Write down the genus name of the sandfly. (1)
 - ii. Describe the habitat used for egg laying by the sandfly, giving two examples of such habitats. (4)
 - iii. How can you use the wings to differentiate the sandfly adult from the blackfly adult? (2)
 - iv. Name one disease that may be transmitted to humans during the sandfly bite. (1)
 - v. Chemical sprays may be used for the control of sandflies. Identify sites that you would spray during such control programs and explain why you would pay attention to these areas. (4)

[20 marks]

QUESTION 4

- a.
- i. Mention two reasons why tsetseflies are of public health importance. (2)
 - ii. The life cycle of the tsetsefly is different from that of most bloodfeeding Diptera. Mention two ways in which the tsetsefly life cycle is different from that of other Diptera. (2)
 - iii. Mention three common risk areas where people are likely to be bitten by tsetseflies. (3)
 - iv. Explain what control measures you may put up in the risk areas mentioned in (iii) above to prevent human bites. (3)
 - v. The current strategy for tsetsefly control is based on an effective surveillance programme. Discuss how an Environmental Health Officer may work hand in hand with other health cadres to mount a successful surveillance programme in a community. (4)

- b. i. Mention two species of bedbugs that feed on humans. (2)
- ii. Bedbugs have no wings hence travel only short distances. Explain how bedbugs are dispersed from one bedroom to another and from one house to another. (2)
- iii. A number of householders refused malaria spraying teams access to their homes because they believed that spraying caused an increase in the bedbug population. In your opinion, how did this thinking come about among the householders ? (2)

[20 marks]

QUESTION 5

- a. Fleas are small, wingless bloodsucking insects that cause irritation, serious discomfort, loss of blood and transmit diseases to humans.
- i. To what order do fleas belong ? (1)
- ii. Explain how the pupal stage of fleas protects itself from predators to mount a successful life cycle. (2)
- iii. Mention two diseases that may be transmitted through contact with fleas. Also, explain how the flea transmits these to people. (4)
- iv. Explain how individuals may protect themselves from flea bites. (1)
- v. Explain how hygienic measures may also be used to control fleas in a homestead. (2)
- vi. Control of fleas is never complete if control in some domestic pets such as dogs and cats is ignored. Explain how fleas may be controlled in pets such as dogs and cats. (4)
- b. Only the body louse is a vector of human disease.
- i. Name three diseases that may be transmitted to humans through the bite of the body louse. (3)
- ii. Discuss the measures you may apply on a young boy infested with head louse to rid him of the nuisance and prevent re-infestation. (3)

[20 marks]

QUESTION 6

a. Poisonings due to pesticides are usually acute and result from extensive skin contact or ingestion. Signs and symptoms vary with the type of pesticide and can sometimes be confused with those of other illnesses.

List briefly, symptoms that would indicate pesticide poisoning in/on :

- i. general (1)
- ii. the skin (1)
- iii. the eyes (1)
- iv. the digestive system (1)
- v. the respiratory system (1)
- vi. the nervous system (1)

b. Give the first aid treatment you would recommend after confirming pesticide poisoning with the following symptoms :

- i. if breathing has stopped (2)
- ii. if there is insecticide on the skin (2)
- iii. if patient has swallowed pesticide (2)

c. Outline the precautions one needs to take into consideration when storing or transporting pesticides to avoid human poisoning. (3)

d. What precautions need to be taken when disposing off left over insecticide ? Give two examples of areas where left over insecticide may be disposed off. (3)

e. Mention two WHO specifications on the labelling of containers of pesticides. (2)

[20 marks]

QUESTION 7

a. Write briefly the pathogenesis you would expect to observe in a case of hypodermatosis. (3)

b. Explain what happens to result in :

- i. ocular myiasis (2)
- ii. traumatic myiasis (2)

c. i. What effects may be brought about by the sting of a large number of bees on an individual ? (3)

ii. Explain the steps you would take to assist one who has been severely stung by bees. (3)

d. The number of bites of humans by spiders is about 500 per year though the fatality rate is below 1%. Most of the fatal cases are due to the Blackwidow spider, *Latrodectus mactans*.

- i. Give another common name for the blackwidow spider. (1)
- ii. Describe the hiding areas of the blackwidow spider (3)
- iii. Explain how you may prevent bites of the blackwidow spider from occurring in a homestead. (3)

[20 marks]