

UNIVERSITY OF SWAZILAND
FACULTY OF HEALTH SCIENCES

FINAL EXAMINATION PAPER – DECEMBER 2009

TITLE OF PAPER : VECTOR 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/WORKOUT DETAILS
SHOULD BE SUBMITTED WITH YOUR ANSWER
SHEET

Answer **QUESTION 1** and **ANY FOUR** others.

QUESTION 1 MULTIPLE CHOICE : indicate your response by writing the letter corresponding to your chosen answer among those given for each item.

- i. The general body cavity of an arthropod is known as a
 - A. gut
 - B. proventriculus
 - C. crop
 - D. haemocele
 - E. hypopharynx

- ii. The Subclass Apterygota is a group of arthropods that
 - A. have wings
 - B. have no wings
 - C. have wings developing from within the body
 - D. have wings that develop from outside the body
 - E. has vestigial wings

- iii. The eggs of lice are called
 - A. ova
 - B. stipes
 - C. nits
 - D. ligula
 - E. terga

- iv. Which one of the following arthropods has legs that are well adapted for jumping?
 - A. Horsefly
 - B. Flea
 - C. Housefly
 - D. Tsetsefly
 - E. Blackfly

- v. Some insects are oviparous, others viviparous or larviparous, and some even pupiparous.
Which one of the insects below is larviparous?
 - A. *Glossina morsitans*
 - B. *Simulium damnosum*
 - C. *Blatta orientalis*
 - D. *Xenopsylla cheopis*
 - E. *Musca domestica*

- vi. The order of responses to flea bite is
- immediate-type reaction – no reaction – delayed reaction – immediate-type reaction
 - immediate-type reaction – delayed reaction – immediate-type reaction – no reaction
 - no reaction – delayed reaction – immediate-type reaction
 - delayed reaction – immediate-type reaction – no reaction
 - no reaction – immediate type reaction – delayed reaction
- vii. The common name of *Stomoxys calcitrans* is
- bot fly
 - sweat fly
 - tumbu-fly
 - flesh-fly
 - stable-fly
- viii. Which one of these arthropods spins a triangular cocoon around its pupal stage?
- Musca domestica*
 - Phlebotomus papatasi*
 - Simulium damnosum*
 - Glossina pallidipes*
 - Tabanus latipes*
- ix. Reduviid bugs are also called
- assassin bugs
 - conenoses
 - kissing bugs
 - All of the above
 - A and C
- x. Insect psychosis means
- urtication
 - vesication
 - sensitization
 - entomophobia
 - moulting

(20)

QUESTION 2

- Mention what the mouthparts of bedbugs are adapted for. (2)
 - Describe the antennae of bedbugs. (1)
 - What characteristic would you use to identify the bedbug among other bugs? (1)
- Explain the process by which bedbugs may transmit pathogens to man. (3)
 - Other than disease transmission, why are bedbugs undesirable pests of man? (3)

- c. Discuss control of bedbugs using chemical methods. Make sure to include and indicate the World Health Organisation recommendation. (10)

[20 marks]

QUESTION 3

- a. Complete the following passage about fleas by writing the roman numeral number and the corresponding missing word e.g. (ii. Fleas)

The compound eyes are absent in the flea, but some species have large or small simple eyes. The abdomen has ___(i)___ segments. The ninth segment of both the male and female bears a dorsal plate called the ___(ii)___ or ___(iii)___, which is covered with sensory setae. The "penis" or ___(iv)___ of the male is chitinous and coiled and its structure is complex. There are a large number of spines on the head and thorax known as "combs" or ___(v)___ . On the cheek there may be a ___(vi)___ comb and on the posterior border of the first thoracic segment a ___(vii)___ comb. (7)

- b. i. Describe the antenna of the flea. (3)
ii. Mention two areas on which eggs of fleas may be laid. (2)
- c. i. Name one disease of man associated with *Xenopsylla cheopis*. (1)
ii. What the name of the organism responsible for the disease named in c(i)? (1)
iii. Name a host of *Xenopsylla cheopis* that is responsible for infestation of human dwellings with the flea. (1)
iv. Describe the process by which *Xenopsylla cheopis* fleas transmit disease to man. (2)
- d. Control of fleas include control in domestic animals such as dogs and cats. Discuss flea control in dogs using flea collars. (3)

[20 marks]

QUESTION 4

- a. Mosquito distribution in Swaziland varies with changing altitude e.g. Anopheles mosquitoes are confined to the Lowveld while Culicine mosquitoes are abundant in the Middleveld and Highveld.
- i. Discuss two reasons why *Anopheles* mosquito breeding is confined to the Lowveld. (4)
- ii. Discuss two reasons why Culicine mosquitoes breed successfully in the Highveld than in the Lowveld. (4)
- b. Explain how you would identify Anopheline adult mosquitoes using:
- i. Resting position (2)
- ii. Female palps (2)
- iii. Male palps (2)

c. Discuss the following methods of mosquito control, expressing your view about their success using examples taken elsewhere around the world or within Swaziland.

- i. Insecticide treated bednets (3)
- ii. Indoor residual spraying with DDT (3)

[20 marks]

QUESTION 5

Blackflies are important in the transmission of various parasitic diseases including onchocerciasis.

- a. What is another common name for blackflies? (1)
- b. Name the parasite that causes onchocerciasis. (1)
- c. Describe the habitat preferred by blackflies for egg laying. (2)
- d. Explain how you can use the wing of blackflies to differentiate them from horseflies. (2)
- e. Discuss the life cycle of blackflies under the following headings:
 - i. Larval stage (4)
 - ii. Pupa stage (4)

(NB: You may use diagrammatic illustrations to make your description clearer).

- f. A major control programme against *Simulium damnosum* in the Upper Volta River basin in West Africa was started in 1974. The strategies involved in this programme involved systematic destruction of blackfly larvae. Discuss the strategy, expression your views on its strength and weaknesses. (6)

[20 marks]

QUESTION 6

- a. Pubic lice and head lice do not normally transmit disease to man.
 - i. Explain why it is still necessary to control the arthropods to prevent infestation of humans. (3)
 - ii. Explain how you can differentiate between the head louse and a pubic louse using the legs and the head/thorax body parts. (4)
 - iii. Explain why control of lice in domestic animals is important. (3)
 - iv. Discuss the advice you may give to a friend who is infested with pubic lice on how he can rid himself/herself of the nuisance and also prevent future infestations. (4)
- b. High cockroach infestations usually equally occur at homesteads situated in low altitudes as those situated in high altitudes.
 - i. Explain why cockroach distribution does not vary with changing altitude. (2)
 - ii. Discuss cockroach control through insecticide use and family hygiene. (4)

[20 marks]

QUESTION 7

The common housefly has a cosmopolitan distribution and exists as a synanthrope, and an important mechanical vector of various infectious agents.

- a. Describe the habitats preferred by housefly for egg-laying. (3)
- b. Explain how you may differentiate between the wing of *Musca domestica* and that of other flies. (2)
- c. Discuss 3 ways the housefly transmits pathogens mechanically to man. (3)
- d. Name 3 diseases that may be caused by pathogens transmitted by houseflies. (3)
- e. Explain how the following insecticides are used in housefly control:
 - i. Organophosphates (3)
 - ii. Pyrethrins (2)
 - iii. Larviciding insecticides (2)
- f. Besides use of insecticides, how can the housefly population be controlled? (2)

[20 marks]