



# **UNIVERSITY OF SWAZILAND**

Faculty of Health Science

Department of Environmental Health  
Science

Supplementary Semester 1 Examination  
July 2012

**Title of paper:** Vector and Vermin Control

**Course code:** EHS 214

**Time allowed:** 2 HOURS

**Marks allocation:** 100 Marks

**Instructions:**

- 1) **ANSWER QUESTION 1 AND ANY FOUR OTHER QUESTIONS**
- 2) Each question is weighted 20 marks
- 3) Write neatly and clearly

**DO NOT OPEN THIS QUESTION PAPER UNTIL  
PERMISSION TO DO SO HAS BEEN GRANTED BY THE  
CHIEF INVIGILATOR**

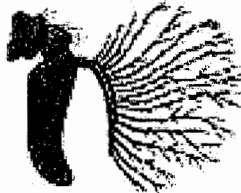
**ANSWER QUESTION 1 AND ANY FOUR QUESTIONS FROM THIS SECTION.**

## **QUESTION 1**

- i. Name the suborder to which blackflies (genus *Simulium*) belong
  - A. Diptera
  - B. Pterygota
  - C. Hemiptera
  - D. Nematocera
  - E. Insecta
  
- ii. Which one of the flies below lay their larvae in coarse sand or humus-containing sand?
  - A. blackflies
  - B. horseflies
  - C. tsetseflies
  - D. sandflies
  - E. houseflies
  
- iii. Which one of the following statements is NOT true about bedbugs?
  - A. They are nocturnal feeders
  - B. They have a pair of thoracic stink glands
  - C. They have a pair of bead-like antennae
  - D. Their abdomen consists of eight segments
  - E. Their bodies are covered with bristles of hairs
  
- iv. Which one of these flies is involved in furuncular myiasis?
  - A. *Hypoderma* species
  - B. *Cochliomyia hominivorax*
  - C. *Ostruc ovis*
  - D. *Dermatobia hominis*
  - E. Both A and D
  
- v. The saddleback caterpillar is associated with which one of the following effects of arthropods on man?
  - A. Vesication
  - B. Sensitisation
  - C. Urtication
  - D. Envenomation
  - E. Tissue invasion

- vi. Permanent, clean, sunlit water is associated with the breeding habitats of:
- A. *Culex* mosquitoes
  - B. *Anopheles* mosquitoes
  - C. *Aedes* mosquitoes
  - D. *Coquilidia* mosquitoes
  - E. All of the above

- vii. The antenna shown below is that of:



- A. *Phlebotomus papatasi*
  - B. *Culex maculipennis*
  - C. *Musca domestica*
  - D. *Simulium damnosum*
  - E. *Glossina palpalis*
- viii. Which one of the following is NOT a part of the mouthparts of an insect?
- A. Chelicerae
  - B. Mandibles
  - C. Maxillae
  - D. Antenna
  - E. Labium
- ix. Which one of the following statements is true?
- A. Lice have sexual dimorphism
  - B. Bedbugs have two pairs of wings
  - C. The wing of flies belonging to the family Simuliidae have a colour pattern on their wings
  - D. Sandflies are active during the day and they sleep at night
  - E. The abdomen of *Phthirus pubis* has no lateral hairy tubercles
- x. Which of these cockroaches lives in sewer systems and pipes?
- A. *Blatella germanica*
  - B. *Periplaneta americana*
  - C. *Blatta orientalis*
  - D. Both *Blatella germanica* and *Blatta orientalis*
  - E. Both *Periplaneta americana* and *Blatella germanica*

[20 marks]

## QUESTION 2

- a. Name the orders to which blackflies and horseflies belong. (2)
- b. Describe the habitats are preferred by the following insects for their reproductive processes?
- i. blackfly (2)
  - ii. horsefly (2)
- c. Discuss briefly, the anatomy of the larva stage of a blackfly (drawings may be included if desired for clarity) (3)
- d. Discuss briefly, the anatomy of the larval stage of a horsefly. (drawings may be included if desired for clarity) (3)
- e. Explain how you may differentiate between the following:
- i. the wing of *Simulium damnosum* and that of *Tabanus latipes* (4)
  - ii. the antenna of *Simulium damnosum* and that of *Tabanus latipes* (drawings may be included if desired for clarity) (4)

**[20 marks]**

## QUESTION 3

- a. Mosquitoes belong to the class Insecta. Mention 3 important characteristics of this group/class of arthropods. (3)
- b. To what order do mosquitoes belong? Explain what characteristics make the mosquitoes belong to this order. (3)
- c. Describe the anatomical arrangement of the following parts of a mosquito:
- i. Eyes (2)
  - ii. Mouthparts (2)
- d. Explain how you may use the following to differentiate between the different stages of Culicine and Anopheline mosquitoes:
- i. Breathing tube of larvae (2)
  - ii. Palps of adult mosquitoes (2)
- e. Discuss, also explaining the suitability of two methods you may use to control mosquitoes biologically. (6)

**[20 marks]**

#### QUESTION 4

- a. Name the family to which tsetseflies belong. (1)
- b. Explain briefly the distribution of the different forms of sleeping sickness in Africa. (4)
- c. Explain how you may differentiate the adults of tsetsefly and housefly using the following body parts:
  - i. the wing (2)
  - ii. the antennae (2)
  - iii. the thorax (2)
  - iv. abdomen (2)
- d. One method suggested for control of tsetsefly is bush clearing.
  - i. Would bush clearing achieve better results for *G. morsitans* than for *G. palpalis* control. Explain your answer. (3)
  - ii. Mention 2 reasons why bush clearing is not used commonly to control tsetsefly populations even in endemic areas. (4)

[20 marks]

#### QUESTION 5

Compared to the cockroach, a housefly is said to be a more important mechanical transmitter of disease to man.

- a. Name the order and the family to which the housefly belong. (2)
- b. Explain why a housefly is more dangerous than a cockroach, basing your argument on the habits of the two in relation to mechanical transmission of disease. (5)
- c. Besides habits, the mouthparts of the housefly are well suited for pathogen transmission. Explain the characteristics of the mouthparts of the housefly that make it well adapted for pathogen transmission. (5)
- d. Flies breed in manure and garbage. Explain the steps you would take to limit or prevent fly breeding in:
  - i. manure and in (4)
  - ii. garbage cans (4)

[20 marks]

## QUESTION 6

- a. Snakes cause about 20 000 – 30 000 deaths annually from their toxic venomous bites of man.
- Mention 3 methods by which snake venom may be introduced into the body of man. (3)
  - Mention 3 factors that determine the severity of the toxicity or the symptoms. (3)
  - Explain briefly the symptoms associated with snake bites. (3)
  - List 4 methods by which people may prevent snake envenomation in an area that is highly populated with venomous snakes. (4)
- b. It is often said that the venom of some spiders is probably greater than that of snakes.
- Name two species of venomous spiders. (2)
  - Mention two areas that may be inhabited by these venomous spiders. (2)
  - Mention 3 ways by which envenomation by spiders may be prevented. (3)

[20 marks]

## QUESTION 7

- a. The life cycle of the bedbug goes through incomplete metamorphosis.
- Name the order to which bedbugs are classified. (1)
  - Define incomplete metamorphosis. (2)
  - Name 3 habitats on which bedbugs may lay their eggs. (3)
  - Discuss the life cycle of bedbugs in the egg and larva stages. (4)
- b. Mention two reasons why bedbugs are of medical importance. (2)
- c. Discuss one method you may use to prevent infestation of bedbugs in your house/dwelling. (2)
- d. A second family of bugs are those of Reduviidae. One species of these bugs are commonly referred to as assassin bugs, kissing bugs or cone-noses. What do these common names mean?
- assassin bugs (1)
  - kissing bugs (1)
  - cone-noses (1)
- e. Name one disease transmitted to man by assassin bugs. (1)
- f. Mention 2 methods you may use to prevent bites from assassin bugs. (2)

[20 marks]