

**UNIVERSITY OF SWAZILAND**  
**FACULTY OF HEALTH SCIENCES**

**SUPPLEMENTARY EXAMINATION PAPER – JULY, 2012**

TITLE OF PAPER : VECTOR AND VERMIN CONTROL

COURSE CODE : EHS 215

TIME : 2 HOURS

MARKS : 100

INSTRUCTIONS : ANSWER **QUESTION 1** AND **ANY FOUR** OTHER  
QUESTIONS

: 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

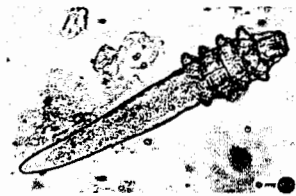
: ALL CALCULATIONS/WORK-OUT DETAILS  
SHOULD BE SUBMITTED WITH YOUR ANSWER  
SHEET

**QUESTION 1 : MULTIPLE CHOICE**

Write down the letter corresponding to your chosen answer to indicate your response to each sub-question e.g. xv. E

- i. Which of the following is not an effect of mites on man?
- A. Causing skin dermatitis
  - B. Exsanguination
  - C. Painful bites
  - D. Causing allergic reactions
  - E. Disease transmission
- ii. The pathogen for tick-borne typhus or Rocky Mountain Spotted Fever is:
- A. *Borrelia burgdoferi*
  - B. *Borrelia duttoni*
  - C. *Babesia bigermina*
  - D. *Babesia microti*
  - E. *Rickettsia rickettsii*

- iii. The mite shown below is:



- A. *Dermanyssus gallinae*
  - B. *Sarcoptes scabiei*
  - C. *Demodex folliculorum*
  - D. *Trombicula akamushi*
  - E. *Allodermanyssus sanguineus*
- iv. Which of these rodent diseases is passed on to humans following direct or indirect contact with infected urine of rodents?
- A. Murine typhus
  - B. Leptospirosis
  - C. Rickettsial pox
  - D. Plague
  - E. Salmonellosis
- v. One difference between *Rattus rattus* and *Rattus norvegicus* is
- A. *R. rattus* has a blunt nose while *R. norvegicus* has a pointed one
  - B. *R. norvegicus* has a longer tail
  - C. *R. norvegicus* has large eyes and *R. rattus* has smaller eyes
  - D. *R. norvegicus* has larger ears while *R. rattus* have smaller ones
  - E. *R. norvegicus*' body is heavy and thick while that of *R. rattus* is light and slender

- vi. Which one of the following is NOT an important factor for consideration during application of the insecticide as a wettable powder?
- A. The size of the population of insects to be removed
  - B. Toxicity of the insecticide
  - C. Types of surfaces to be treated
  - D. Atmospheric temperature and humidity
  - E. Type of sprayer used
- vii. Which one of the snail genera shown below is responsible for transmitting *Schistosoma mansoni* in Africa?
- A. *Bulinus*
  - B. *Biomphalaria*
  - C. *Oncomelania*
  - D. *Lymnaea*
  - E. *Parafossarulus*
- viii. The reason for including pyrethrum extract in aircraft insecticide sprays is because pyrethrum:
- A. has a residual effect and will kill any insects that land on sprayed surfaces for a longer period of time
  - B. is a solvent for the active ingredient of the insecticide
  - C. will knock down immediately any flying insect that comes into contact with it
  - D. controls the pH of the insecticide formulation
  - E. is a synergist for the active ingredient of the formulation
- ix. DDT is still recommended for indoor residual spraying in the control of malaria transmitting mosquitoes because:
- A. no resistance to the insecticide has been reported
  - B. DDT kills only mosquitoes and no other insects in the house
  - C. no other effective insecticide is available
  - D. DDT is safe to humans at the dosages employed during indoor residual spraying
  - E. DDT does not vaporise from the walls and therefore does not cause any inhalation problems
- x. Larval petroleum oils are no longer recommended for use in the control of mosquitoes in ponds because:
- A. the mosquitoes have developed resistance to it
  - B. they kill other non-targeted organisms in the water
  - C. the oils create breathing problems to humans who drink the water
  - D. there are no solids in the water that will absorb the oils and release them slowly to retain insecticidal effects
  - E. the oils have been found to actually have no insecticidal effect on mosquitoes

## QUESTION 2

- a. Name the class and the order to which mites belong. (2)
- b. Mention four undesired effects of mites on humans and other animals that mandate their control. (4)
- c. What is infestation with mites called? (1)
- d. *Allodermanysus sanguineus* is a little-studied blood-sucking mite that has some medical importance.
- i. What is the common name for *Allodermanysus sanguineus*? (1)
  - ii. Write down the technical name of the host of *Allodermanysus sanguineus*. (1)
  - iii. Name one disease and the pathogenic agent that may be transmitted by *Allodermanysus sanguineus* to man. (2)
- e. *Leptotrombidium akamushi* whose larvae feed on skin tissue, are important pests of humans.
- i. What common name is given to the larval stage of *Leptotrombidium akamushi*? (1)
  - ii. Name one disease and the pathogen transmitted to humans during bites of larval stages of *Leptotrombidium akamushi*. (2)
  - iii. Describe the habitat of *Leptotrombidium akamushi* where man may become infested. (2)
  - iv. Other than avoiding visits to infested areas, how can infestations with *Leptotrombidium* mites be prevented or reduced? (4)

[20 marks]

## QUESTION 3

- a. *Otobius megnini* is a parasite of dogs and humans are accidentally infested.
- i. Describe the appearance of the larvae of *O. megnini*. (2)
  - ii. In what part of the body of the dog do *O. megnini* ticks usually reside? (1)
  - iii. Discuss three effects on dogs that are infested with *O. megnini*. (3)
  - iv. Describe one method you may use to treat a dog that has been infested with *O. megnini*. (2)
  - v. Describe one method you may use to prevent future infestation of your dog with *O. megnini*. (2)
- b. Complete the table of tick human disease below: (4)

Tick	Disease	Pathogen
<i>Ornithodoros spp.</i>	African relapsing fever	(i)
(ii)	babesiosis	(iii)
<i>Ixodes spp.</i>	(iv)	<i>Borrelia burgdoferi</i>

- c. Discuss three ways in which cultivation of land could lead to control of hard ticks inhabiting the ground. (6)

[20 marks]

#### QUESTION 4

- a. Write down the Food and Agricultural Organisation's (FAO's) definition of pesticide. (2)
- b. Mention 3 ways in which an insecticide may be taken into the body of an individual who is applying the insecticide? (3)
- c. Explain what precautions the individual applying the insecticide should take to prevent contamination in the ways listed in (b) above. (3)
- d. Insecticidal pellets have been used against mosquito larvae in irrigated or flooded lands. Explain why insecticidal pellets are suitable for use in vegetation covered water bodies. (4)
- e. Pesticide use should be avoided and alternatives used where they are available and effective because pesticides may have deleterious effects on human life. Discuss FOUR negative effects of pesticides in humans. (8)

[20 marks]

#### QUESTION 5

- a. Write down the parasites for which the following genera of snails are intermediate hosts:
  - i. *Bulinus* (1)
  - ii. *Biomphalaria* (1)
  - iii. *Lymnaea* (1)
- b. During addition of molluscicide in streams or irrigation canals, it is always important to determine the velocity of the water in the stream or canal.
  - i. Why is it important to determine the velocity of the water? (2)
  - ii. Describe a method by which you can determine the velocity of the water. (3)
  - iii. Describe two methods by which a molluscicide can be released into the stream or irrigation canal in order to effectively add a reasonable amount of the molluscicide in order to achieve a molluscicidal effect on the snails. (4)
- c. Discuss snail control under the following headings:
  - i. Biological control (4)
  - ii. Environmental control (4)

[20 marks]

#### QUESTION 6

- a. One disease that involves rodents for its transmission to humans is plague.
  - i. Name the pathogenic agent of plague. (1)
  - ii. What animal is a vector of plague? (1)
  - iii. Name the genus and species name of the vector of plague. (2)
  - iv. Name the rodent responsible for harbouring the vector of plague. (1)
- b. Explain how man acquires the following diseases from rodents:
  - i. leptospirosis (2)
  - ii. salmonellosis (2)
  - iii. rat-bite fever (2)

- c. Mention 5 reasons associated with rodent control for draining or wrapping household garbage before placing in storage container. (5)
- d. Mention FOUR methods used in ships during docking to prevent rodent infestation. (4)

[20 marks]

#### QUESTION 7

- a. Define the following terms as they apply to pesticide use and application:
  - i. chronic effect (2)
  - ii. LD<sub>50</sub> (2)
  - iii. toxic hazard (2)
- b. An insecticide is has pyrethrins, "deltamethrin" and "imiprothrin", and a carbamate, "propoxur" written on the container, a can.
  - i. What insecticidal effect do the pyrethrins have on the target insect pest? (2)
  - ii. What insecticidal effect does the carbamate have on the insect pest? (2)
  - iii. If the container had the pyrethrins only, what problem(s) would arise during application of the insecticide? (2)
- c. Dichloro-diphenyl-trichloroethane (DDT) is commonly used in indoor residual spray in the control of mosquito vectors of malaria.
  - i. During indoor spraying, how far is the nozzle kept in order to get a good insecticide coating on the wall? (2)
  - ii. What are the negative effects of using DDT in indoor residual spraying? (3)
  - iii. What are the advantages of using DDT for indoor residual spraying? (3)

[20 marks]