



**RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES**

**B.Sc. (General) Degree in Applied Sciences
Third year – Semester I Examination - November/December 2016**

ZOO 3209 – MEDICAL ENTOMOLOGY

Time: Two (02) hours

This paper has three parts; Part A, Part B and Part C.

Answer all questions in Part A and Part B and any two questions from Part C.

PART A – Multiple Choice Questions

Select the most suitable answer from responses a - d and underline it.

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1. Which one of the following scientists is considered as the founder of the field of tropical medicine?
a) Sir Ronald Ross b) Patrick Manson c) Theobald Smith d) Frederick L. Kilbourne

2. Which one of the following scientists discovered the malaria parasite in the gastrointestinal tract of mosquito realizing that malaria was transmitted by mosquitoes?
a) Sir Ronald Ross b) Josiah Nott c) Theobald Smith d) F.P. Mackie

3. Which one of the following is **not** a role of Medical Entomologists?
a) Collecting of vector samples from disease prevailing area.
b) Study the origin and distribution of the vector that is responsible for transmission of a particular vector-borne disease.
c) Study the ecology, behavior and biology of the vector that is responsible for transmission of a particular vector-borne disease.
d) Treat the patients who are suffering from a vector-borne disease.

4. Which one of the following diseases does **not** involve a vector for its transmission?
 a) Typhoid b) Leshmaniasis c) Polio d) Yellow fever
5. What is the vector borne disease that is eradicated in Sri Lanka according to World health organization reports in 2016?
 a) Dengue b) Malaria c) Chkungunya d) Japanese Encephalitis
6. Which one of the following vector borne diseases is considered as the recently emerged disease in Sri Lanka?
 a) Dengue b) Chargas disease c) Leishmaniasis e) Chikungunya
7. Which one of the following insect Order represent the highest numbers of medically important insects?
 a) Hemiptera b) Lepidoptera c) Coleoptera d) Diptera
8. Which of the insects below is included in the Order Phthiraptera?
 a) True bugs b) Fleas c) Lice d) Flies
9. Select the **incorrect** statement regarding vector-borne diseases.
 a) Vector-borne diseases are illnesses caused by pathogens and parasites in human populations.
 b) The poorest segments of society and least-developed countries are most affected by vector-borne diseases.
 c) These diseases also exacerbate poverty, illness and disability preventing people from working and supporting themselves and their family and causing further hardship and impeding economic development.
 d) Flies are the best known vectors in the world.
10. Myiasis is caused by
 a) Fleas b) True flies c) Lice d) Mosquitoes

11. What is an arbovirus?
 - a) virus that is carried by a tree-dwelling mosquito
 - b) virus that is carried by any arthropod
 - c) virus that is carried specifically by a mosquito
 - d) virus that infects arthropods

12. Which one of the following diseases is considered as the world worst vector-borne disease?
 - a) Dengue b) Lymphatic filariasis c) Malaria d) Japanese encephalitis

13. Which one of the following pairs is **incorrect** regarding disease - vector relationship?
 - a) Malaria - *Anopheles culicifacies*
 - b) Lymphatic filariasis - *Culex quinquefasciatus*
 - c) Leishmaniasis - *Culex gelides*
 - d) Dengue - *Aedes aegypti*

14. What mosquito-borne virus can be transmitted transovarially from an infected female to their eggs?
 - a) Dengue virus
 - b) Chikungunya virus
 - c) Japanese encephalitis virus
 - d) None of the above

15. Anthropophilic insects prefer
 - a) Human hosts
 - b) Mammalian hosts other than human hosts
 - c) Bird hosts
 - d) None of the above

16. Select the **incorrect** statement.
- a) Dengue is caused by a virus.
 - b) Epidemic typhus is caused by a bacterium.
 - c) Pigs act as reservoirs for Japanese encephalitis.
 - d) Flea is the vector of plague.
17. Which one of the following statements is **incorrect**?
- a) The parasite either multiplies and/or changes in form or both within the vector in biological transmission.
 - b) Malaria is an example for biological transmission.
 - c) Parasite can change its form within the vector without multiplying during propagative transmission.
 - d) Dengue virus is an example for propagative transmission.
18. Epidemic typhus and Chagas disease both be transmitted to another host via
- a) the saliva of the vector.
 - b) feces of the vector.
 - c) body fluids of the vector.
 - d) Blood of the vector.
19. What is the mosquito borne disease where vaccine is given to the babies in Sri Lanka?
- a) Dengue
 - b) Chikungunya
 - c) Japanese encephalitis
 - d) Malaria
20. What is the recently discovered mosquito borne virus that causes microcephaly in newborn when infected to pregnant mothers?
- a) Dengue
 - b) Chikungunya
 - c) Japanese encephalitis
 - d) Zika

21. Which mosquito genus has a siphon that modified for piercing plant tissues?
 a) *Aedes* b) *Anopheles* c) *Culex* d) *Mansonia*
22. Mosaic pattern of egg shells occurs in
 a) *Culex* spp. b) *Anopheles* spp. c) *Mansonia* spp. d) *Aedes aegypti*
23. Mosquitoes which are usually sucking blood from birds are known as
 a) Zoophagic b) Anthropophagic c) Ornithophagic d) Endophilic
24. *Aedes aegypti* and *Aedes albopictus* larvae can be differentiated to each other by using the shape of
 a) Palmate hair b) Siphon c) anal gills d) Comb scales
25. Which one of the following statements is **incorrect** regarding dengue vector?
 a) Major vector of the dengue in Sri Lanka is *Aedes aegypti*.
 b) Dengue vector breeds in highly polluted water.
 c) Biting time of the dengue vector is morning and evening.
 d) Resting sites of the major vector of the dengue is indoors.
26. Which of these sub-families is not in the family Culicidae?
 a) Culicinae
 b) Anophelinae
 c) Phlebotominae
 d) Toxorhynchitinae
27. Which one of the following statements is **incorrect** regarding mosquitoes?
 a) Greatest species diversity of mosquitoes occur in tropical regions.
 b) Analysis of human biting mosquito ratio is 50% male and 50% females.
 c) Larvae have large head compared to the body.
 d) Hind wings are halteres.

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28. What is the main advantage of using larval control against adult mosquitoes?
- a) Control will supplement natural control
 - b) Larvae are restricted to confined aquatic habitats that can be treated
 - c) Larval habitats do not support sensitive other organisms
 - d) All of the above
29. Use of Bti is an efficient method for controlling which stage of the *Aedes aegypti*?
- a) larval stage b) Adult stage c) egg stage d) pupal stage
30. Which one of the following vectors breed primarily in water collecting containers?
- a) *Anopheles culicifacies*
 - b) *Culex quinquefasciatus*
 - c) *Culex gelidus*
 - d) *Aedes aegypti*

(30 marks)

PART B - Structured essay

Write your answer in the given space

Question Number 01

1. Define the following terms in relation to vector-borne diseases.

a) Epidemiology

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b) Control

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c) Elimination

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2. State **five** importance of arthropods as direct agents of disease or discomfort.

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3. Name **three** medically important insect orders and their representative insects.

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4. State **four** living factors involve in a vector borne disease.

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5. State **three** social factors involve in a vector borne disease.

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6. State the difference between primary host and secondary host.

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7. State the primary host and secondary host of diseases given in the following table.

Disease	Primary host	Secondary host
Malaria		
Lymphatic filariasis		

8. Name **three** vector-borne diseases where parasite/pathogen transmission occurs through contamination of skin or mucous membranes.

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9. State the vector species and causative organisms of following diseases in Sri Lanka.

- a) Malaria (Scientific name)
- b) Leishmaniasis (Common name).....
- c) Lymphatic filariasis (Scientific name).....
- d) Dengue (Scientific name).....

10. State the breeding sites of following vectors in Sri Lanka.

- a) *Culex quinquefasciatus*
- b) *Aedes aegypti*
- c) *Anopheles culicifacies*
- d) *Culex gelidus*

(20 marks)

Question Number 02

1. State **three** major roles of a medical entomologist in relation to control of vector-borne diseases.

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2. Define the following terms with examples.

a) Propagative transmission

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b) Cyclo-development transmission

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c) Cyclo-propogative transmission

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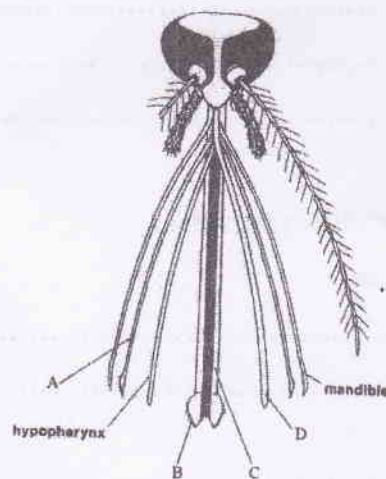
3. What is the difference between transovarial transmission and transtadial transmission?

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4. Define the following terms in relation to vector mosquitoes.

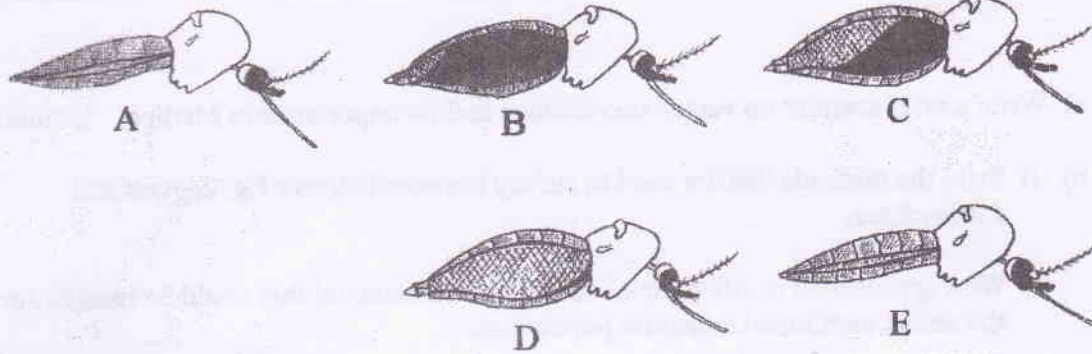
- a) anthropophagic
- b) Zoophagic
- c) Endophagic
- d) Exophagic
- e) Endophilic
- f) Exophilic

5. Name the parts label as A, B, C, and D in diagram of the head of female culicine mosquito given below.



A..... B.....
 C..... D.....

6. Following diagrams show the diagrammatic representation of the gonotrophic cycle of a female mosquito. Briefly explain A, B, C, D and E.



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7. State two larvivorous fish that can be used to control mosquitoes.

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(20 marks)

PART C – Essay Questions

Answer any two questions.

1. a) Write a brief account on vector surveillance and its importance in Medical Entomology.
b) i) State the methods that are used to survey the populations of *A. aegypti* and *A. albopictus*.
ii) With appropriate justifications, explain the best method that could be used to survey the above mentioned mosquito populations.
(15 marks)
2. Write an account on the biology, behavior and control of dengue vectors in Sri Lanka.
(15 marks)
3. a) State **five** adult mosquito collecting techniques.
b) Write an account on **one** of the collecting technique emphasizing its advantages and disadvantages.
(15 marks)

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