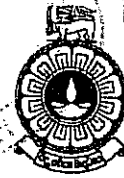


THE OPEN UNIVERSITY OF SRI LANKA  
B.Sc DEGREE PROGRAMME – LEVEL 5

02 APR 2012



COURSE TITLE – INSECT BIOLOGY  
COURSE CODE – ZLU 3186/5186

OPEN BOOK TEST – I  
DURATION: ONE HOUR (01)

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Registration No:.....

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Date: 31<sup>st</sup> March 2012

Time: 11.00 am – 12. 00noon

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ANSWER ALL QUESTIONS IN PARTS A & B.

- Part A consists of three topics with thirty five blanks and the blanks should be filled with suitable words.
- Part B is a structured essay question consisting of ten parts from 2.1 – 2.08. Answers should be written in the space provided.

At the end of the examination the whole paper should be handed over to the examiners.

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The Open University of Sri Lanka

B.Sc Degree Programme.

Course Title: INSECT BIOLOGY

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Open Book Test I

Registration No: - .....

Part A

1.0. Fill in the blanks in the articles given below with the most appropriate word/s.

1. Insect general Organization:

(1) ..... are composed of about twenty original (2) ..... They show considerable advance on their presumed myriapodan ancestors in having developed a much greater degree of (3)..... which is the co-ordination or (4) amalgamation of segments to perform some particular group of functions. (5) ..... has been vitally important in the evolution of (6) ..... It has originally developed in response to some immediate need and has opened the way for further adaptive (7) ..... The result has been the division of the insect body into (8) ..... regions, head, thorax and abdomen, each with its specially modified appendages.

The head bears eyes, antennae, labrum and the post oral appendages forming mouthparts namely (9) ....., maxillae, mandible, and hypopharynx. The thorax consists of three (10)....., which are still more or less clearly distinguishable as separate segments. Even though thorax developed in response to the adoption of a hexapod gait, it provided the point of balance at which wings could function effectively, and became further enlarged and modified when they evolved on its second and third segments. The (11) ..... remained relatively unmodified, except that the appendages of most of its segments atrophied, although they can still be seen in the apterygotes and the embryos of higher insects. It

consisted originally of 11 (12) ....., and there is a minor degree of tagmosis in the terminal segments.

## 2. Insect Mouthparts

The mouth, is bounded anteriorly by the (13) ....., and laterally by the lower margins of the mandibles and first maxillae. However, there are many variations depending on the method of (14) ....., The type of mouthparts will help to determine what insect order it belongs to. The type of mouthparts will also determine the type of damage left by the (15) ..... Often when we arrive at the 'scene of the crime', the insect that caused the damage is long gone and we use the type of damage as a clue to determine which insect may have caused the damage. In addition, some insecticides are more effective against insects with certain types of mouthparts, so the type of mouthparts can affect control decisions. There are many types of insect mouthparts –cockroach has (16) ....., mouthparts and mosquito has piercing-sucking mouthparts.

**Piercing-sucking** mouthparts form a (17) ..... which is inserted into a food source. The food source can be a plant in (18) ..... insects.

(19) .....to plants caused by insects with piercing-sucking mouthparts would include stunting, yellowing, distorted growth, and honeydew (waste material from some sucking insects). Three (20) ..... of insects have this type of mouthparts: Hemiptera, Thysanoptera and the Homoptera. Because the feeding occurs inside the leaf, these insects are less likely to be killed by insecticides that only coat the outside of the leaf. However, they are often very susceptible to systemic insecticides.

**Chewing mouthparts** are common in many different insect orders. Usually the most visible part of these mouthparts is the large mandibles on each side that move from side to side. Often there are noticeable, finger-like palps on each side of the mouth.

Many of the insect orders have chewing mouthparts, including beetles (21) (.....), caterpillars (Lepidoptera), the grass hoppers

(Orthoptera), and termites (22) (.....). Insects with chewing mouthparts leave noticeable (23) .....on leaves, wood, or fruit. Insecticides that lay on the surface of the plant may be effective as these insects often consume more of the surface area of plants than insects with piercing-sucking mouthparts.

Many moths and butterflies have siphoning mouthparts that are adapted to draw nectar from long-throated flowers. Unlike piercing-sucking mouthparts, these do not penetrate into the plant. When at rest, the tube is held as a coil under the head. A few moths have tubes that may be several inches in length when extended.

The other common type is that of the **sponging mouthparts**. Many of the flies, including the (24) ....., have sponging mouthparts. Sponging mouthparts appear as a conical process with sponge like lobes at the end. This type of mouth is modified to (25) ..... liquids. These flies often use enzymes to (26) ..... the food before feeding.

### 3. Insect Evolution:

Just as the Paleozoic is often called the age of the trilobite, modern time is often called the age of the insect. The insect fossil record extends back some 400 million years to the lower (27)..... The (28)..... (winged forms) underwent a major radiation in the Carboniferous. The Endopterygota underwent another major radiation in the Permian. Survivors of the mass extinction evolved in the Triassic to what are essentially the modern Insect Orders that persist to modern times.

Insect (29) ..... is characterized by rapid (30)..... with selective pressures exerted by environment. Rapid adaptation is influenced by their high fecundity. It appears the rapid radiations, and to this day the appearance of new (31) ..... result in insects filling all available environmental niches. Insect evolution is closely related to the evolution of (32)..... plants. Insect adaptations include feeding on flowers and related structures with some 20% of

insects depend on flowers, nectar or pollen for their food source. This symbiotic relationship is even more paramount in evolution considering that about 2/3 of flowering plants are insect pollinated. Insects are also vectors of many (33) ..... that may even have been responsible for the decimation or extinction of some mammalian species.

Endopterygota is comprised by the orders of insects which are holo-metabolous, having larval stages, and are separated from the Exopterygota in that they have an internal vs. external wing development. Examples from this group are the (34) ....., (35) ..... . Not included with this group are the Hemiptera, Homoptera, Orthoptera and Isoptera.

[35 Marks]

**Part B**

Registration No: .....

**2.0. Answers should be written in the space provided.**

**2.1. Explain the following terms.**

**1. Ametabolous insects:**

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**2. Primitive insects:**

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**3. Insect Parasites:**

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**4. Parasitoid insects:**

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**2.2. Giving one example for each type name three types of orientation found in insect head.**

**1**.....  
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**E.g.** .....

**2**.....  
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**E.g.**

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3.....  
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E.g.

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2.3. List the most important pollinating insect orders.

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2.4. Giving examples for each type, describe the different types of modifications seen among the legs of insects.

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2.5. List the different stages in the evolution of insects.

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2.6. List the main parts of the insect integument

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2.7. List the advantages and disadvantages of the integument in insects.

**Advantages:**

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**Disadvantages:**

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2.8. List the major adaptive features of insects that contribute to their success as land animals

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II.....

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III.....

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IV.....

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V.....

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[65 Marks]

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