THE OPEN UNIVERISITY OF SRI LANKA
B.Sc DEGREE PROGRAMME – LEVEL 5
COURSE TITLE – ENTOMOLOGY
COURSE CODE – ZOU 3163/5163
OPEN BOOK TEST – II
DURATION: ONE HOUR (01)

Registration No:.....

Date: 31 October 2009 Time: 3.00 – 4.00 pm

ANSWER ALL QUESTIONS IN PARTS A & B.

- **Part A consists of one topic with thirty five blanks (35) and the blanks should be filled with suitable words.**
- **Part B is a structured essay question consisting of ten parts from 2.1 – 2.10. Answers should be written in the space provided.**

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

The Open University of Sri Lanka

B.Sc Degree Programme.

Course Title: Entomology

Course code: ZOU 3163 / 5163

Open Book Test I

Registration No:.....

PART A

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

Social insects: Insects share resources and reproduce cooperatively. The shared resources are shelter, defense, and food (collection or production). After a period of population growth, the insects reproduce in several ways. As (1)..... insect groups grow, they evolve more differentiation between (2) .....but reintegrate into a more closely organized system known as (3)..... These are the most advanced societies with individual polymorphism, and they contain insects of various ages, sizes, and shapes. All the eusocial insects are included in the orders (4) .....(termites) and Hymenoptera (wasps, bees, and (5).....).

The social insects have evolved in various patterns. In the Hymenoptera, the society is composed of only females; males are produced periodically for their (6)..... They usually congregate and attract females, or they visit colonies with virgin females and copulate there. In the Hymenoptera, sex is determined largely by whether the individual has one or two sets of (7)..... Thus the queen has the power to determine the sex of her offspring: if she lets any of her stored (8) .....reach the egg, a female is produced; if not, a male results. In the more primitive bees and wasps, social role (caste) is influenced by interaction with like but not necessarily related individuals. The female that can dominate the others assumes the role of queen, even if only temporarily. Domination is achieved by aggression, real or

(9)....., or merely by a ritual that is followed by some form of salutation by the subordinates. This inhibits the yolk-stimulating (10) .....and prevents the subordinates from contributing to egg production; if it fails to work, the queen tries to destroy any eggs that are laid. Subordinate females take on more and more of the work of the group for as long as the (11) .....is present and well. At first, all the eggs are fertilized and females develop, with the result that virgin females inhabit the nest for the first batches. They are often undernourished, and this, together with their infertility, reduces their urge to leave the nest and start another one. Such (12) .....are said to be produced by maternal manipulation.

Reproductive ants, like (13)....., engage in a massive nuptial flight, after which the females, replete with sperm, go off to start a new nest. At some stage after the (14....., the (15) .....break off their wings, which have no further use. Workers, however, never have wings because they develop quickly and pass right through the wing-forming stages; their ovaries and genitalia are also reduced. Ant queens can prevent the formation of more queens; as with the (16)....., they do this behaviorally by using (17)..... They also force the workers to feed all larvae the same diet. To this (18) .....caste control is added a blastogenic control; eggs that are laid have a developmental bias toward one caste or another. This is not genetic; bias is affected by the age of the queen and the season: more worker-biased eggs are laid by young queens and by queens that are emerged in spring. In some ants, workers mature in (19) .....sizes. Since they have disproportionately large heads, the biggest workers are used mainly for defense; they also help with jobs that call for strength, like cutting vegetation or cracking nuts.

Social insects make remarkable nests that protect the brood as well as to regulate the (20)..... The simplest nests are cavities dug in soil or soft wood, with walls smoothed and plastered with (21) .....that

set hard. Chambers at different levels in the soil are frequently connected by vertical shafts. so that the inhabitants can choose the chamber with the best microclimate. (22) .....and ants also make many different types of arboreal nests. These nests are usually made of fecal material, but one species of ant (*Oecophylla*) binds leaves together with silk produced in the (23) .....of their larvae that the workers hold in their jaws and spin across leaves. A whole group of ants (for example, *Pseudomyrmex*) inhabit the pith of plants.

Social bees use wax secreted by their cuticular glands and frequently blended with gums from tree exudates for their nest (24)..... Cells are made cooperatively by a curtain of young bees that scrape wax from their (25)....., chew it with (26)....., and mold it into the correct shape; later it is planed and polished. With honeybees the hexagonal (27) .....reaches perfection as a set of back-to-back cells, each sloping slightly upward to prevent honey from running out. The same cells are used repeatedly for brood and for storage; or they may be made a size larger for rearing males. Only the (28) .....cell is (29)..... with a circular cross section and an opening below.

The ubiquity and ecological power of (13) social insects depend as much on their ability to evolve (30) .....relations with other organisms as on the coherence of their social organization. Wood and the (31) .....it contains are normally available as a source of energy only to bacteria and fungi. However, it is used as a basic resource by both termites and ants that have evolved a technique of culturing these organisms. Though lower termites have unusual (32) .....as intestinal symbionts, higher termites have bacteria in pouches in their (33) .....gut. Many have a fungus that they culture in special chambers in their nests. The termites feed on woody debris, leaves, and grass cuttings; the fungus digests these materials with the aid of termite feces and produces soft protein-rich bodies that the termites share with

their juveniles and reproductives, neither of which are able to feed themselves. Protected from the weather, the fungus can remain active throughout the dry seasons—an inestimable advantage in the subtropics.

Many ants collect and store seeds that they mash and feed directly to their larvae. Provided they are collected when dry and stored in well-ventilated chambers, these seeds can remain viable and edible for an entire season. The plants benefit because not all the seeds are eaten; some that start to germinate are thrown out with the rubbish of the colony—in effect a way of planting them. Others are left behind by the ants when they change nests. In this way, grass seeds can extend their range into dry areas that they could not reach alone.

The dispersal of plant (34) .....by bees is a well-known (35)....., and it has led to the evolution of many strange shapes, colors, and scents in flowers. Quite specific flower-bee relationships may exist in which one plant may use very few species of bees for the transfer of pollen.

PART B

2.0. Answers should be written in the space provided.

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

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2.2. Name the secondary defense mechanisms present in insects.

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2.3. What is meant by aposemtism? Give one example.

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2.4. (a) What are mechanoreceptors in insects ?

(b) List the different types of mechanoreceptors found in insects.

a).....

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b).....

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2.5. List the different modes of defense systems adopted by insect communities.

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2.6. (a) What are entomophagous insects?

(b) Give one example for it.

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b).....

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2.7. List in what ways the insects are beneficial to human beings.

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2.8. List the different types of circardian rhythms seen in insects and define them briefly giving examples

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2.9. Write characteristic features of insect pheromones.

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2.10. Give the scientific name of coconut red weevil and state its classification.

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