

THE BRITISH BEEKEEPERS' ASSOCIATION

Founded in 1874

Registered Charity No. 212025

EXAMINATION FOR PROFICIENCY IN APICULTURE MODULE 5 HONEY BEE BIOLOGY

Candidate Number:

24th March 2018 Time Allowed 1½ hours

Instructions to Candidates

Read the questions carefully. Answer All Sections. It is recommended not to spend more than 10 minutes on Section A, 50 minutes on Section B and 30 minutes on Section C.

Unless stated otherwise questions apply to honey bees.

Use **BLACK** pen for text. **Black** pencil may only be used for diagrams. **DO NOT USE COLOURS.**

Examiner Use Only

Question	Sec A	B11	B12	B13	B14	B15	C16	C17	Total
Mark									
Moderated									

SECTION A (10 marks, 1 for each question)

Answer **ALL** the questions in this section. Use one or two word or short phrase answers. Please write your answers on the question paper.

- Q1 Name the valve at the anterior end of the ventriculus.
- Q2 Precisely where on a bee is the labellum (flabellum) located?
- Q3 How many pairs of spiracles does an adult bee have?
- Q4 Juvenile hormone is secreted by what organ?
- Q5 Name one type of flight muscle.
- Q6 Name the fat body cells which are only found in the larva and pupa.
- Q7 How many malpighian tubules does a larva have?
- Q8 What is the purpose of the hamuli?
- Q9 Name an organ which is normally smaller in summer bees than in winter bees.
- Q10 A ramus is part of which structure?

PLEASE HAND IN THIS SHEET AT THE END OF THE EXAMINATION

MODULE 5 HONEY BEE BIOLOGY

24th March 2018

SECTION B (60 marks, 15 for each question)

Answer any **FOUR** questions from this section. Write short notes for your answers.

Marks

- | | | | |
|-----|-----|--|---|
| Q11 | (a) | Name the different types of eyes found in a bee and state the number of each type of eye and their location on the bee's head. | 6 |
| | (b) | Describe the structure of a single ommatidium. You may use a simple diagram to illustrate your answer. | 7 |
| | (c) | What is on the surface of the ommatidium and what function does that feature serve? | 2 |
| Q12 | (a) | Using a table list the differences between winter bees and summer bees. | 6 |
| | (b) | List the factors determining caste determination. | 9 |
| Q13 | (a) | List four functions of haemolymph. | 4 |
| | (b) | Name the two parts of haemolymph. | 2 |
| | (c) | Describe how haemolymph circulates around the bee's body. | 9 |
| Q14 | (a) | Give an account of the development of the egg from the time it is laid to the point at which the larva emerges. | 9 |
| | (b) | Name the features A-F on the attached diagram. | 6 |
| Q15 | (a) | List three differences between the endocrine and exocrine gland. | 3 |
| | (b) | Name three of the glands making up the endocrine system in a larva, describe where they are located and what they do. | 9 |
| | (c) | What endocrine gland is present in the larva but not in the adult bee and what does it produce? | 2 |

SECTION C (30 marks)

Answer **ONE** question from this section. Give *labelled* diagrams where applicable.

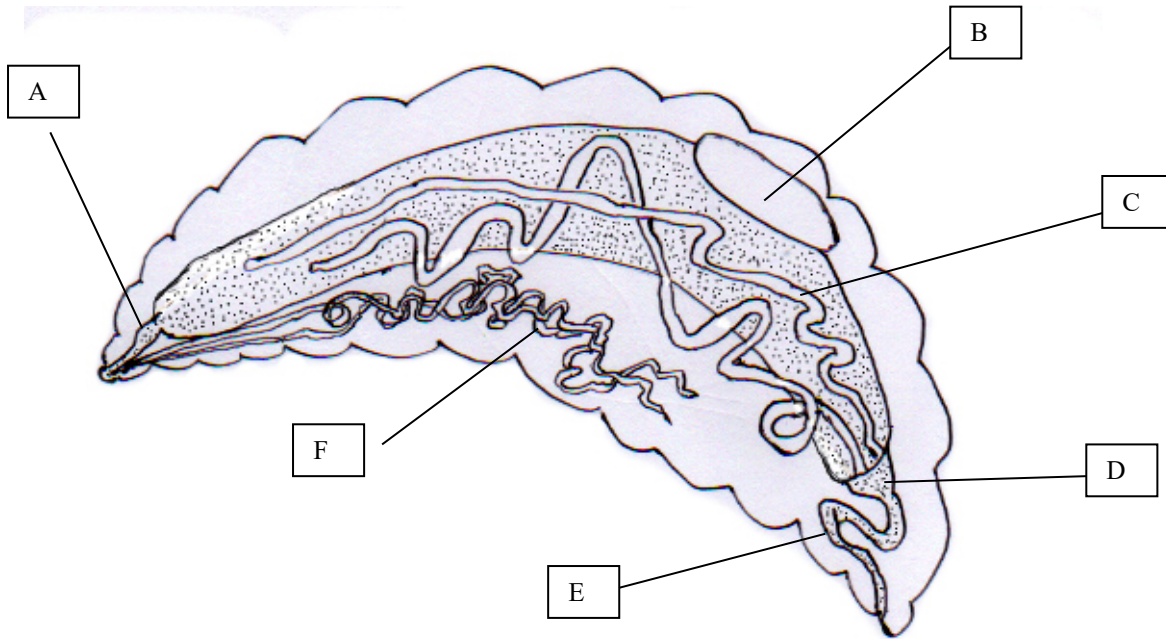
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|-----|-----|---|----|
| Q16 | (a) | Describe where the sting is located in an adult bee, the features forming the structure of the sting and how these operate to inject venom into a victim. | 20 |
| | (b) | What is the outcome when a worker bee sting penetrates human skin. | 5 |
| | (c) | Name the main components which are found in venom. | 5 |
| Q17 | (a) | How are laying workers normally controlled in a colony? | 2 |
| | (b) | Explain the circumstances in which laying workers might come to dominate a colony and what might happen to the colony. | 7 |
| | (c) | Give an account of what happens to an egg from the time it is released from the queen's ovary until it is laid in a worker cell. Do not include in your answer a detailed description of the fertilisation process. | 7 |
| | (d) | Complete the attached table to show the differences/similarities in the external appearance of the worker and drone. | 14 |

MODULE 5 HONEY BEE BIOLOGY

24th March 2018

Q14 (b) Name the features A-F on the diagram below.

6



- A _____
- B _____
- C _____
- D _____
- E _____
- F _____

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MODULE 5 HONEY BEE BIOLOGY

24th March 2018

Q17 (d) Complete the attached table to show the differences/similarities in the external appearance of the worker and drone.

14

Body Part	Worker	Drone
Body size and shape		
Abdomen		
Eyes		
Mouthparts		
Legs		
Antennae		
Glands		

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