

THE BRITISH BEEKEEPERS' ASSOCIATION

Founded in 1874

Registered Charity No. 212025

EXAMINATION FOR PROFICIENCY IN APICULTURE MODULE 5 HONEY BEE BIOLOGY

Candidate Number:

9th November 2019 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 hooks on the rear wings of the honey bee.
- Q2 Which gland produces juvenile hormone?
- Q3 Name the organ that controls nitrogen excretion.
- Q4 How many ostia does a bee have?
- Q5 Where is the organ of Johnston situated?
- Q6 What is the function of the *sensilla basiconica*?
- Q7 Name the protein found in fat cells of adult workers in winter.
- Q8 How many ovarioles should there be in a laying queen?
- Q9 Where does gaseous exchange occur in the honey bee?
- Q10 Which organ in the adult drone stores semen?

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SECTION B (60 marks, 15 for each question)

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

Marks

- | | | | |
|-----|-----|--|----|
| Q11 | (a) | Describe the role of haemolymph in transport within the honey bee. | 4 |
| | (b) | List the functions of the haemolymph. | 7 |
| | (c) | Name the components of haemolymph. | 2 |
| | (d) | Name two structures that cause the haemolymph to circulate. | 2 |
| Q12 | (a) | What are the four functions of the honey bee excretory system? | 4 |
| | (b) | Label the diagram provided and explain the function of this organ. | 8 |
| | (c) | How many of these organs are found in the adult honey bee? | 1 |
| | (d) | Name two waste products excreted by these organs. | 2 |
| Q13 | | Complete the table provided to give one secretion and one action for each gland. | 15 |
| Q14 | (a) | Complete the table provided to show 8 anatomical differences between a queen and worker . | 8 |
| | (b) | Describe the factors in the diet of a larva that cause it to become a queen or a worker. | 7 |
| Q15 | (a) | Label the diagram provided. | 4 |
| | (b) | Draw a simple labelled diagram of a proventriculus and explain how it works. | 6 |
| | (c) | Describe the processing and digestion of pollen. | 5 |

SECTION C (30 marks)

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

- | | | | |
|-----|-----|---|----|
| Q16 | (a) | Describe the production of an egg from germinal cells until it is laid.
(Do not describe the queen's reproductive system). | 10 |
| | (b) | Describe the development of the embryo within the egg until the larva emerges. | 20 |
| Q17 | (a) | Label the diagrams of the worker bee legs provided. | 6 |
| | (b) | Describe how a worker bee collects and transports pollen back to the hive. | 15 |
| | (c) | Describe cleaning the antenna with the foreleg. | 4 |
| | (d) | With the aid of a simple diagram describe the action of the direct flight muscles. | 5 |

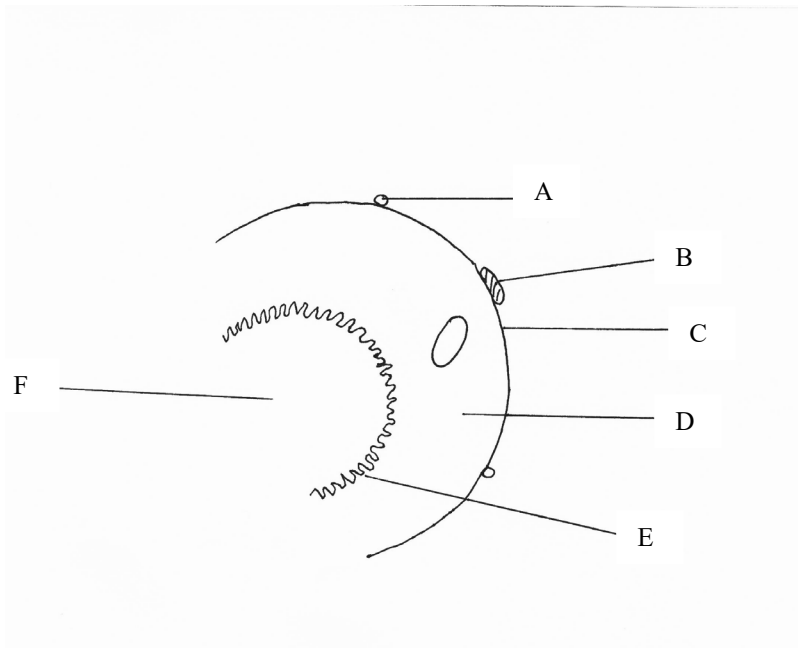
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Q12 (b) Label the diagram below and explain the function of this organ.

8



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

Q13 Complete the table below to give **one** secretion and **one** action for each gland.

15

Structure	Secretion	Action
Hypopharyngeal gland		
Mandibular Gland		
Tergite gland		
Nasonov gland		
Sting		
Arnhart		
Post cerebral gland		
Wax glands	Wax	

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Q14 (a) Complete the table below to show 8 anatomical differences between a queen and worker .

8

Body part	Queen	Worker
Ovaries		
Sting		
Abdomen		
Pollen basket		
Eyes		
Antennae		
Proboscis		
Nasonov gland		

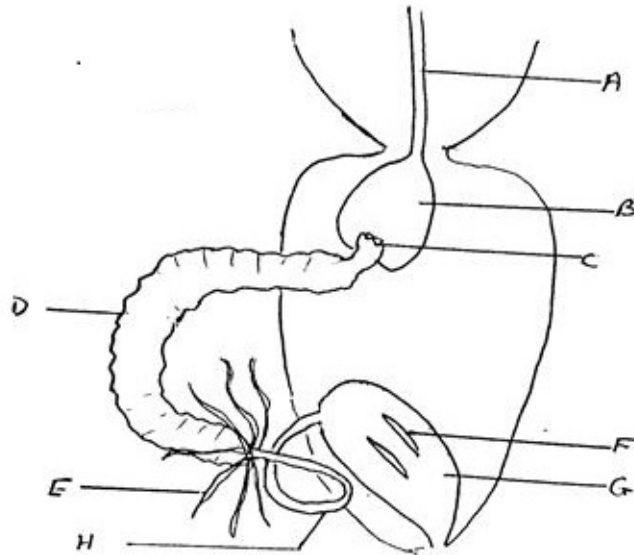
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Q15 (a) Label the diagram below.

4



- A
- B
- C
- D
- E
- F
- G
- H

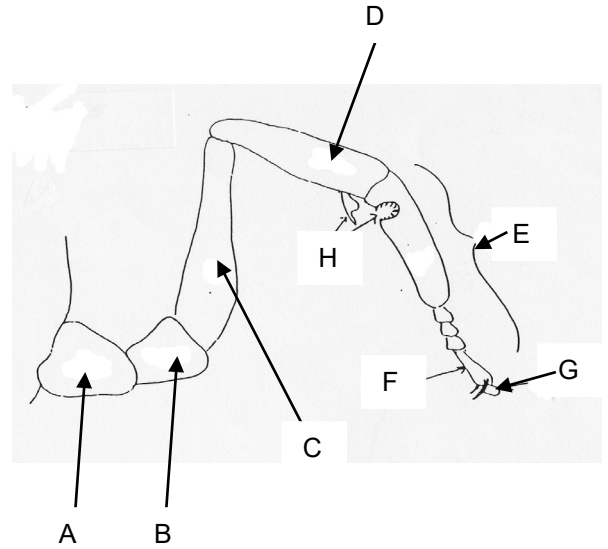
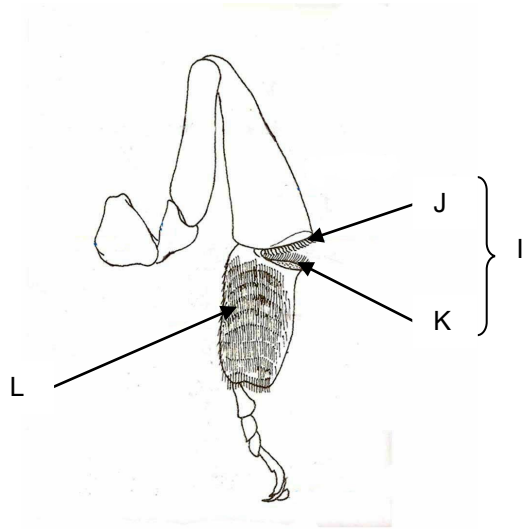
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Q17 (a) Label the diagrams of the worker bee legs below.

6



- A
- B
- C
- D
- E
- F
- G
- H
- I
- J
- K
- L

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