

# THE BRITISH BEEKEEPERS' ASSOCIATION

Founded in 1874

Registered Charity No. 212025

## EXAMINATION FOR PROFICIENCY IN APICULTURE

### MODULE 6 HONEY BEE BEHAVIOUR

9<sup>th</sup> November 2019 Time Allowed 1½ hours

Candidate Number:

#### *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 What pheromone attracts drones from 100m away to the queen in a drone congregation area? .....
- Q2 How many eggs is a strong queen laying per day at the end of May? .....
- Q3 Which honey bee pathogen affects the digestion of pollen? .....
- Q4 Which pheromone contributes to swarm cohesion? .....
- Q5 What happens to the swarm if the queen has clipped wings? .....
- Q6 What ratio of water to nectar is directly metabolised by honey bees? .....
- Q7 Name a product from the breakdown of glucose by glucose oxidase. ....
- Q8 At what age is the queen sexually mature? .....
- Q9 Name a parasite which induces workers to progress to foraging duties early. ....
- Q10 What is the term that describes the process where water is involved in converting nectar to honey? .....

**PLEASE HAND IN THIS SHEET AT THE END OF THE EXAMINATION**

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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)  | What is the definition of a pheromone?  | 3  |
|     | (b)  | Give the name of one pheromone produced by each of these four glands:<br>Nasonov, queen mandibular, the sting, worker mandibular. | 4  |
|     | (c)  | State an effect on behaviour of each of the substances produced by the four glands stated in (b).                                 | 4  |
|     | (d)  | List four different dances carried out by honey bees.   | 4  |
| Q12 | (a)  | State 4 ways in which the colony uses water.  | 4  |
|     | (b)  | How does a honey bee collect nectar from a flower?  | 4  |
|     | (c)  | How would a beekeeper:  |    |
|     | (i)  | recognise a guard bee?  | 4  |
|     | (ii) | recognise an approaching robber?  | 3  |
| Q13 | (a)  | List the sequence of tasks which may be performed by a worker bee after she emerges from her cell.                                | 9  |
|     | (b)  | Draw and label a chart showing the variation in the numbers of adults and brood during the year.                                  | 6  |
| Q14 | (a)  | List the factors contributing to swarming.  | 10 |
|     | (b)  | What factors lead to supersedure, how is this recognised and when can it occur?   | 5  |
| Q15 | (a)  | List the important factors that are taken into consideration when a swarm looks for a new nest site.                              | 7  |
|     | (b)  | How might the swarm utilise propolis to overcome deficiencies in a cavity?  | 3  |
|     | (c)  | How does a worker collect and manipulate propolis?  | 5  |

## SECTION C (30 marks)

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

- |     |      |  |    |
|-----|------|--|----|
| Q16 | (a)  | List the factors that lead to a drone laying queen.  | 5  |
|     | (b)  | How would a beekeeper recognise a colony with a drone laying queen?  | 3  |
|     | (c)  | What happens on the mating flight of:  |    |
|     | (i)  | the queen?   | 5  |
|     | (ii) | the drone?   | 5  |
|     | (d)  | Describe the queen's egg laying behaviour throughout the season and the effect of internal and external factors. | 9  |
|     | (e)  | What could cause failure of the queen to mate?   | 3  |
| Q17 | (a)  | Provide a definition of homeostasis as it applies to <i>Apis mellifera</i> .                                     | 2  |
|     | (b)  | Describe how a normal colony of honey bees regulates cluster temperature in a hive:-                             |    |
|     | (i)  | as the ambient temperature falls from about 18°C to below -5°C;  | 12 |
|     | (ii) | as the ambient temperature rises from about 20°C to over 36°C.   | 11 |
|     | (c)  | Describe the behaviour of an individual bee in a winter cluster.   | 4  |
|     | (d)  | How do bees detect a change in temperature?  | 1  |