

THE BRITISH BEEKEEPERS' ASSOCIATION

Founded in 1874

Registered Charity No. 212025

EXAMINATION FOR PROFICIENCY IN APICULTURE

MODULE 7 SELECTION AND BREEDING OF HONEYBEES

22nd March 2014

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 or 30 minutes on Section C.

Unless stated otherwise questions apply to Honeybees.

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 one commonly used queen introduction cage.
- Q2 What is a gamete?
- Q3 Give one precaution necessary if leaving a newly made up nucleus in the same apiary.
- Q4 How can queenlessness be confirmed in a colony?
- Q5 A small number of queen cells in the centre of a brood nest are likely to be?
- Q6 Name one factor/trait to select in a breeder queen.
- Q7 On finding a queen cell containing a dead black pupa, give a possible cause for this condition?
- Q8 Which continent is thought to be the area of origin of the honeybee?
- Q9 Name the queen rearing method involving a sharpened metal tube tipped with a Perspex cup.
- Q10 What is the earliest day after emergence that a drone is mature to mate?

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) Describe the visual signs common to both drone laying queens and laying workers. 2
- (b) How would the signs differ if it was a: 6
- (i) drone laying queen?
- (ii) laying worker?
- (c) What are the causes of both of these conditions? 7
- Q12 Define the following terms in relation to the honeybee:
- (a) Haploid; 3
- (b) Mitosis; 3
- (c) Meiosis; 5
- (d) Heterozygous; 2
- (e) Chemotaxis migration. 2
- Q13 List the steps to be taken, when aiming to produce between 7 and 10 queen cells, using a simple method based on a double brood chamber colony without using a horizontal screen or division board. Your answer should not include distributing the cells to mating nuclei. 15
- Q14 (a) What is an allele? 2
- (b) How does a recessive characteristic differ from a dominant one? 2
- (c) In the honeybee a condition called white eye is recessive. 1
- (i) What colour eyes do wild type queens have?
- (ii) Draw a simple diagram to show the result of crossing a wild type queen With a drone having white eyes. The queen used comes from a breeding line with no white eye in its history, had been inseminated with sperm only from white eyed drones. 5
- (iii) What words are used to describe the genetic compliment of the drones and the workers produced? 2
- (d) To produce a white eyed worker, how should the bees be crossed and what proportion of white eyed workers would be expected? 3
- Q15 (a) Label the parts A to E on the diagram provided. 5
- (b) Referring to the labelled diagram, briefly describe how an egg is fertilised as it passes through the reproductive system of a previously mated queen. 7
- (c) What influences the number of eggs a queen can lay in a day? 3

SECTION C (30 marks)

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

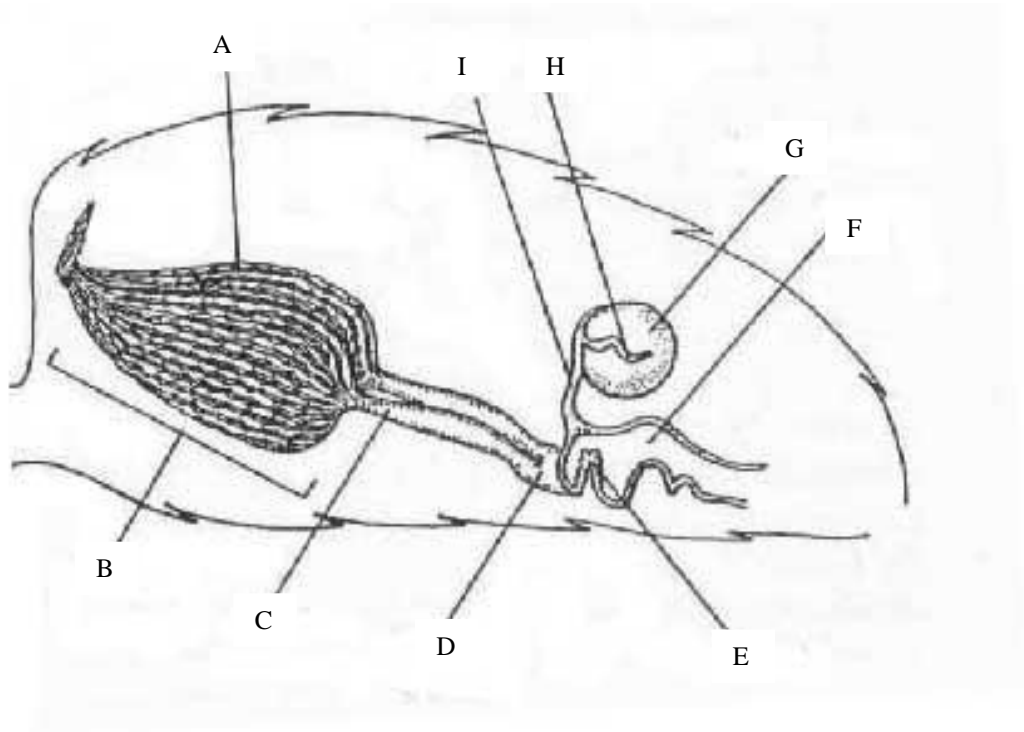
- Q16 (a) Define the expression "line breeding" in relation to the honeybee. 2
- (b) Describe in detail the mating behaviour of the honeybee including the role of drone congregation areas. 28
- Q17 (a) Describe the equipment and the method of Instrumental Insemination of a honeybee queen from the time the queen is mature enough to mate. 25
- (b) Using instrumental insemination, what observable brood condition can arise initially from closely related drones and queens and what are the causes? 5

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Q15 (a) Label the parts A to E of the diagram below.

5



A: _____

B: _____

C: _____

D: _____

E: _____

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