

# THE BRITISH BEEKEEPERS' ASSOCIATION

Founded in 1874

Registered Charity No. 212025

## EXAMINATION FOR PROFICIENCY IN APICULTURE MODULE 5 HONEY BEE BIOLOGY

Candidate Number:

10<sup>th</sup> November 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 How many malpighian tubules has a larva? .....
- Q2 Where on a honey bee's body is the arolium? .....
- Q3 Where are the umbrella valves located in the honey bee? .....
- Q4 How many ostia does the honey bee heart have? .....
- Q5 Name the alarm pheromone not produced in the sting. ....
- Q6 Name one muscle which powers flight. ....
- Q7 What is an endocrine gland? .....
- Q8 Name the storage organs for sperm in the drone. ....
- Q9 Which gland produces melittin? .....
- Q10 Name an enzyme that is added to the nectar by the foraging honey bee from the hypopharyngeal gland. ....

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

# MODULE 5 HONEY BEE BIOLOGY

10<sup>th</sup> November 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)	Label the exocrine glands on the diagram provided.	5
	(b)	Name the exocrine gland on the leg of the honey bee and state specifically where it is located on the leg.	2
	(c)	(i) What is the function of the secretion produced by the Nasonov gland?	1
		(ii) Name two components present in this secretion.	2
	(d)	Give a brief description of wax production by the honey bee.	5
Q12	(a)	List the factors that control larval development into queens or workers.	9
	(b)	List the differences between laying workers and normal workers.	6
Q13	(a)	Label A-L on the diagram provided.	12
	(b)	What is the function of the labrum, mandibles and proboscis?	3
Q14	(a)	Label B, C, D, E on the diagram provided.	4
	(b)	List five functions of the cuticle.	5
	(c)	Outline the differences in the cuticular structure of the trachea, tracheoles and air sacs.	6
Q15	(a)	Name six components that make up the excretory system of the honey bee.	6
	(b)	Name a substance removed/excreted by active cells.	1
	(c)	Give a brief description of the excretory process.	8

## SECTION C (30 marks)

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

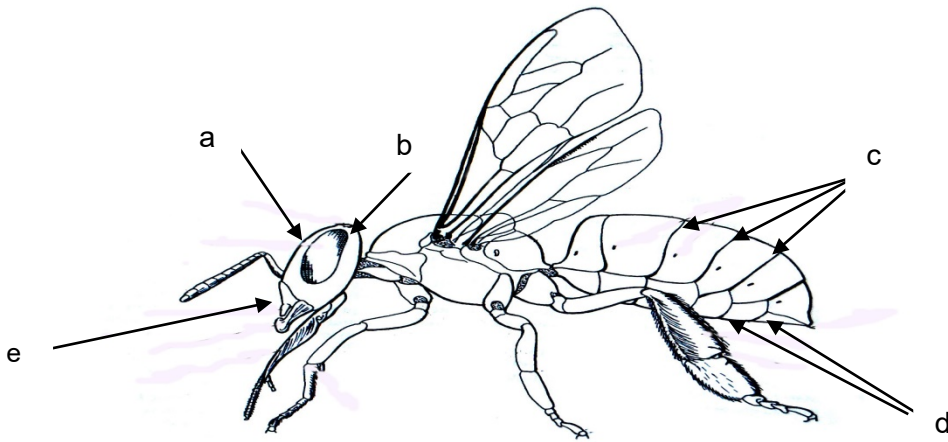
Q16	(a)	(i) Label a to g on the diagram provided.	7
		(ii) State the function of each of the parts labelled.	7
	(b)	Describe how sperm are produced and stored.	7
	(c)	Describe the production of a honey bee egg.	9
Q17	(a)	Explain the structure and role of the oesophagus, crop and proventriculus.	13
	(b)	Describe the structure and role of the ventriculus.	12
	(c)	Describe the structure of the rectum and state why it is of particular use to over-wintering honey bees?	5

# MODULE 5 HONEY BEE BIOLOGY

10<sup>th</sup> November 2018

Q11 (a) Label the exocrine glands on the diagram below

5



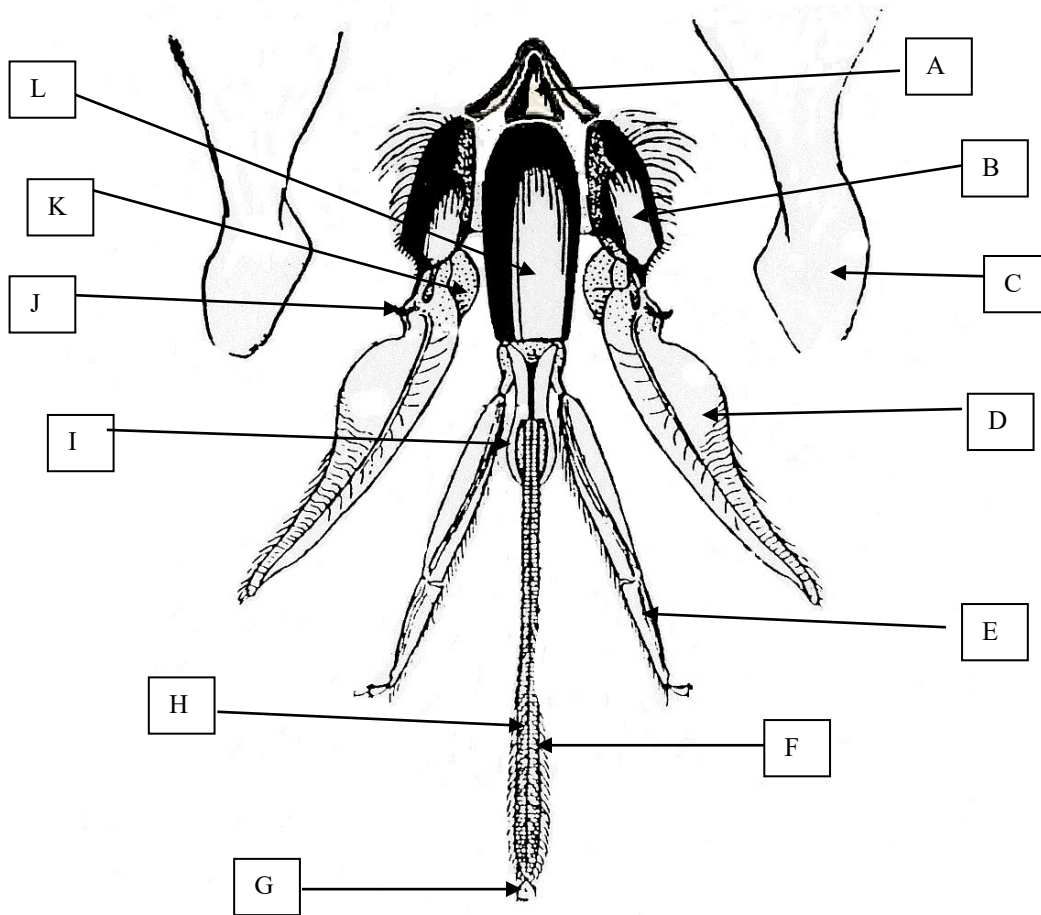
- a .....
- b .....
- c .....
- d .....
- e .....

# MODULE 5 HONEY BEE BIOLOGY

10<sup>th</sup> November 2018

Q13 (a) Label A-L on the diagram below.

12



A .....

B .....

C .....

D .....

E .....

F .....

G .....

H .....

I .....

J .....

K .....

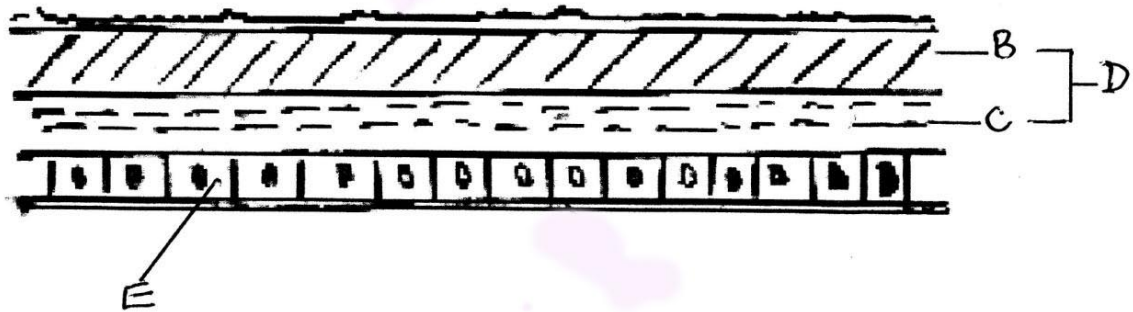
L .....

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**MODULE 5 HONEY BEE BIOLOGY**  
10<sup>th</sup> November 2018

Q14 (a) Label B, C, D, E on the diagram below.

4



- B .....
- C .....
- D .....
- E .....

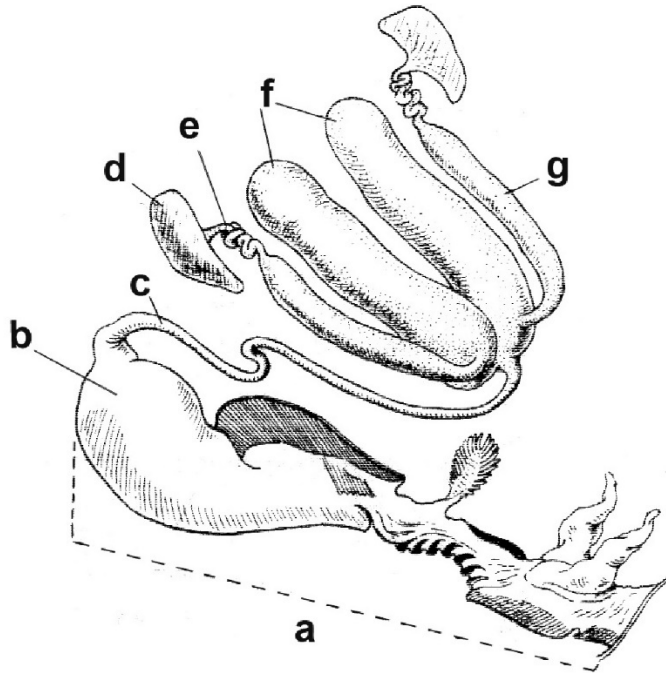
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# MODULE 5 HONEY BEE BIOLOGY

10<sup>th</sup> November 2018

Q16 (a) (i) Label a to g on the diagram below.

7



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

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