THE BRITISH BEEKEEPERS' ASSOCIATION

Founded in 1874 Registered Charity No. 212025

EXAMINATION FOR PROFICIENCY IN APICULTURE
MODULE 5 HONEYBEE BIOLOGY

Candidate Number:

21st March 2015 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 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 Where is the flabellum? ……..

Q2 Where is the flagellum? ……..

Q3 Which gland produces
the pheromone containing Geraniol? ……

Q4 Which type of sensilla gives
the bee its gustatory sense (sense of taste)? ……

Q5 What is the function of
the rhabdom in an ommatidium? ……...

Q6 Name one major function of the ocelli. ……

Q7 Where in the queen are the sperm stored? ……

Q8 What is the function of
the peritrophic membrane? ……

Q9 Which enzyme converts glucose
to gluconic acid and hydrogen peroxide? ……..

Q10 Why are queens and
workers considered as castes ? ……

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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) (i) Name the sclerite types labelled as A, B, C on the diagram provided. 3

(ii) What gives sclerites their strength and hardness? 1

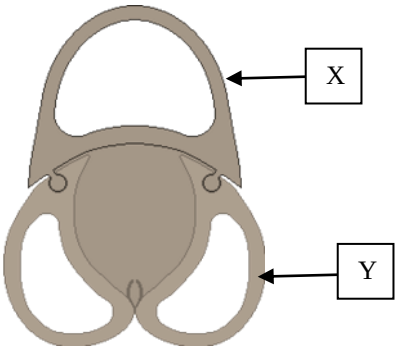
(iii) In the abdomen how are sclerites joined to adjacent sclerites? Give one advantage of being joined in this way? 2

(iv) Give two functions of apodemes on the inner surface of sclerites. 2

(b) Indicate on the diagram provided by means of labelled arrows where the following structures are located: Coxa; Propodeum; Scape; Petiole; Notum. 5

(c) Describe how the structure of the "feet" gives a worker bee the ability to cling upside down on rough surfaces as well as being able to walk up a smooth vertical surface. 2

Q12 (a) (i) The diagram below is a cross-section through the sting. Name the parts labelled X & Y. 2



(ii) Which parts of the sting mechanism are directly connected to each other by the protractor and retractor muscles? 2

(b) List the main 5 active components of bee venom and state their action when a person is stung. 10

(c) Name the active constituent of the alarm pheromone released when the string is extruded. 1

Q 13 (a) List the parts of the endocrine system in the honeybee. 4

(b) Briefly outline the function of these parts. 11

Q14 Describe briefly with the aid of simple diagrams the role muscles in flight. 15

Q15 Excretion of waste involves two body systems:

(a) how is the waste of respiration eliminated from the body? 2

(b) Describe briefly the structure and function of:

(i) the taenidia; 2

(ii) tracheoles. 3

(c) How can a bee manage without a cleansing flight for several weeks during winter? 2

(d) Name two major insoluble components to be found in the waste evacuated from the anus of the bee during a cleansing flight. 2

(e) How is water loss in the faecal matter minimised? 1

(f) At which stage during its development does a worker larva defecate for the first time and why didn't this occur before this stage? 3

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SECTION C (30 marks)

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

Q16	(a)	Discuss the factors that bring about caste determination.	15
	(b)	Write an account of queen pheromones.	15

Q17 Describe the differences and the factors and mechanisms that bring about these differences in:

	(a)	summer and winter bees;	10
	(b)	laying workers and normal workers.	20

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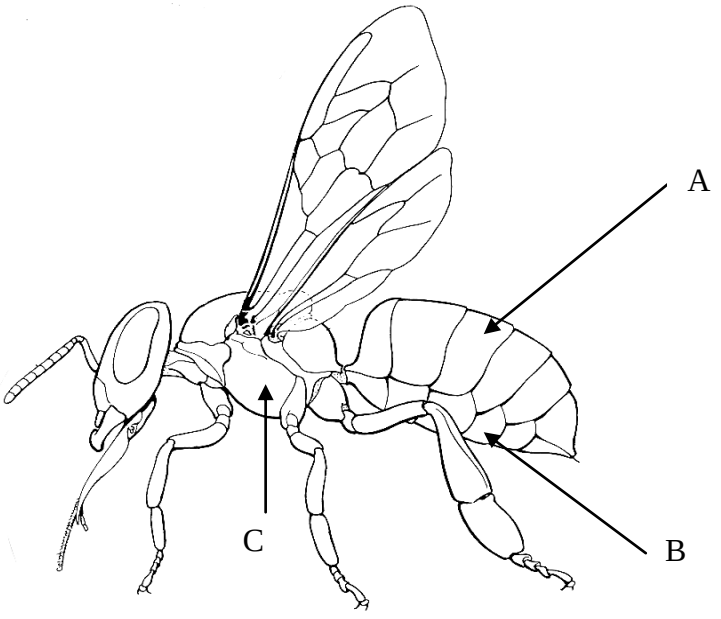
Q11	(a)	(i)	Name the sclerite types labelled as A, B, C on the diagram below.	3
		(ii)	What gives sclerites their strength and hardness?	1
		(iii)	In the abdomen how are sclerites joined to adjacent sclerites? Give one advantage of being joined in this way?	2
		(iv)	Give two functions of apodemes on the inner surface of sclerites.	2
	(b)		Indicate on the diagram by means of labelled arrows where the following structures are located: Coxa; Propodeum; Scape; Petiole; Notum.	5
	(c)		Describe how the structure of the "feet" gives a worker bee the ability to cling upside down on rough surfaces as well as being able to walk up a smooth vertical surface.	2



A ……

B ……

C ……

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