

THE BRITISH BEEKEEPERS' ASSOCIATION

Founded in 1874

Registered Charity No. 212025

EXAMINATION FOR PROFICIENCY IN APICULTURE

MODULE 2 HONEYBEE PRODUCTS AND FORAGE

21st March 2015 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 floral source of unpalatable honey.
- Q2 What is glucose oxidase?
- Q3 What happens if a honey of one relative density is added to a honey of another relative density and not thoroughly mixed?
- Q4 How does a flower from the *Myosotis arvensis* plant indicate to a honey bee that it has been pollinated?
- Q5 Name a component that can be used to help identify honeydew under a microscope.
- Q6 Honey readily absorbs water from the atmosphere. What is the term given to this reaction?
- Q7 What type of extractor can be used to spin ling heather honey from combs?
- Q8 What is melissopalynology?
- Q9 Give a human use for honey bee venom.
- Q10 What is the average water content of a UK floral honey?

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MODULE 2 HONEYBEE PRODUCTS AND FORAGE

21st March 2015

SECTION B (60 marks, 15 for each question)

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

Marks

- | | | | |
|-----|-----|---|----|
| Q11 | (a) | Define pollination. | 2 |
| | (b) | Outline the process of fertilisation in plants. | 7 |
| | (c) | Label on the diagram provided, the following parts:
sepal; style; filament; anther. | 4 |
| | (d) | Define self-incompatibility in apples. | 2 |
| Q12 | (a) | List the physical properties of beeswax. | 5 |
| | (b) | Outline how the wax from used combs and clean cappings can be recovered. | 7 |
| | (c) | List 3 uses of beeswax. | 3 |
| Q13 | (a) | List 8 MAJOR nectar producing plants of the UK. State their flowering periods. (Botanical names are not required) | 8 |
| | (b) | For 7 of those that have been identified, give a characteristic of the honey that might be of relevance to a beekeeper. | 7 |
| Q14 | (a) | What are the maximum legal moisture contents in:
(i) general floral honey;
(ii) heather (<i>Calluna</i>) honey;
(iii) bakers honey in general? | 3 |
| | (b) | List the factors required to cause fermentation of stored honey. | 4 |
| | (c) | List what actions the small scale beekeeper can take to prevent fermentation. | 4 |
| | (d) | Describe what fermented honey looks like. | 4 |
| Q15 | (a) | List the steps involved in preparing sections for sale after they have been removed from the beehive. | 10 |
| | (b) | List any different steps required when preparing cut-comb? | 5 |

SECTION C (30 marks)

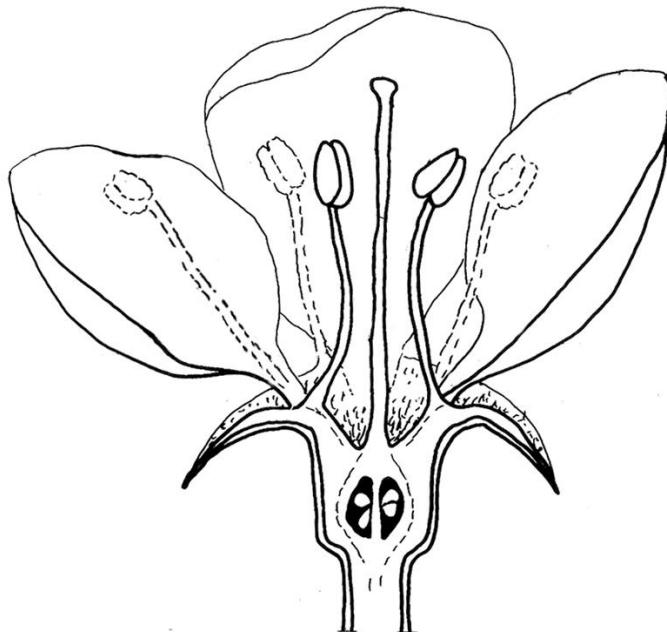
Answer **ONE** question from this section. Give *labelled* diagrams where applicable.

- Q16 Discuss the criteria that a show judge uses to evaluate the following class:
Six 454g Jars of Light Honey labelled as offered for sale.
Explain why each of these criteria also need to be considered when preparing a batch of light liquid honey to be sold via a retail outlet. 30
- Q17 (a) Discuss in detail the factors affecting the granulation of honey. 15
(b) Distinguish between naturally granulated, soft set and seeded types of honey. 5
(c) Describe the preparation of seeded honey. 10

MODULE 2 HONEYBEE PRODUCTS AND FORAGE

21st March 2015

- Q11 (a) Define pollination. 2
(b) Outline the process of fertilisation. 7
(c) Label on the diagram below, the following parts:
sepal; style; filament; anther. 4
(d) Define self-incompatibility in apples. 2



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EXAMINATION FOR PROFICIENCY IN APICULTURE

MODULE 2 HONEYBEE PRODUCTS AND FORAGE

14th November 2015 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.

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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 Give one use to which pollen may be put by humans.
- Q2 How does horse chestnut use colour to communicate information to bees?
- Q3 Give the melting point of beeswax.
- Q4 What is meant by the term thixotropic?
- Q5 What information can the microscopic examination of pollen in honey offer?
- Q6 Name one instrument used to measure the moisture content of honey.
- Q7 Name one way to remove cappings from combs, prior to extraction?
- Q8 Name one plant that produces nectar that is unpalatable to humans?
- Q9 What can be measured to indicate ash content in honey?
- Q10 Name a piece of equipment that can be used to recover wax from old comb.

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MODULE 2 HONEYBEE PRODUCTS AND FORAGE

14th November 2015

SECTION B (60 marks, 15 for each question)

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

Marks

- | | | | |
|-----|-----|---|----|
| Q11 | (a) | Give the judging criteria for a beeswax block. | 5 |
| | (b) | Describe the production of a beeswax block from clean, selected, dry cappings. | 10 |
| Q12 | (a) | Hygiene requirements state that you must make sure that your premises are kept clean. List these requirements. | 7 |
| | (b) | List the information which should appear on label of a jar of honey for retail sale in the UK. | 8 |
| Q13 | (a) | Briefly describe the factors affecting nectar secretion in plants. | 9 |
| | (b) | Plants fall into three main categories in terms of Nectar production: <ul style="list-style-type: none">• plants with nectar containing mostly sucrose;• plants with nectar containing a balance of sucrose fructose and glucose;• plants with glucose predominant nectar. Give an example of a plant yielding each type of nectar. | 3 |
| | (c) | List three factors affecting sugar concentration in nectar. | 3 |
| Q14 | (a) | Describe the two main types of small scale centrifugal honey extractor. | 7 |
| | (b) | Discuss the advantages and disadvantages of these two types of centrifugal extractor. | 8 |
| Q15 | (a) | Give the constituents, expressed in percentage terms, of a typical sample of UK summer floral honey. | 8 |
| | (b) | Identify three enzymes and their actions in a sample of floral honey. | 6 |
| | (c) | What is the allowable limit of hydroxymethylfurfural in floral honey in the UK? | 1 |

SECTION C (30 marks)

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

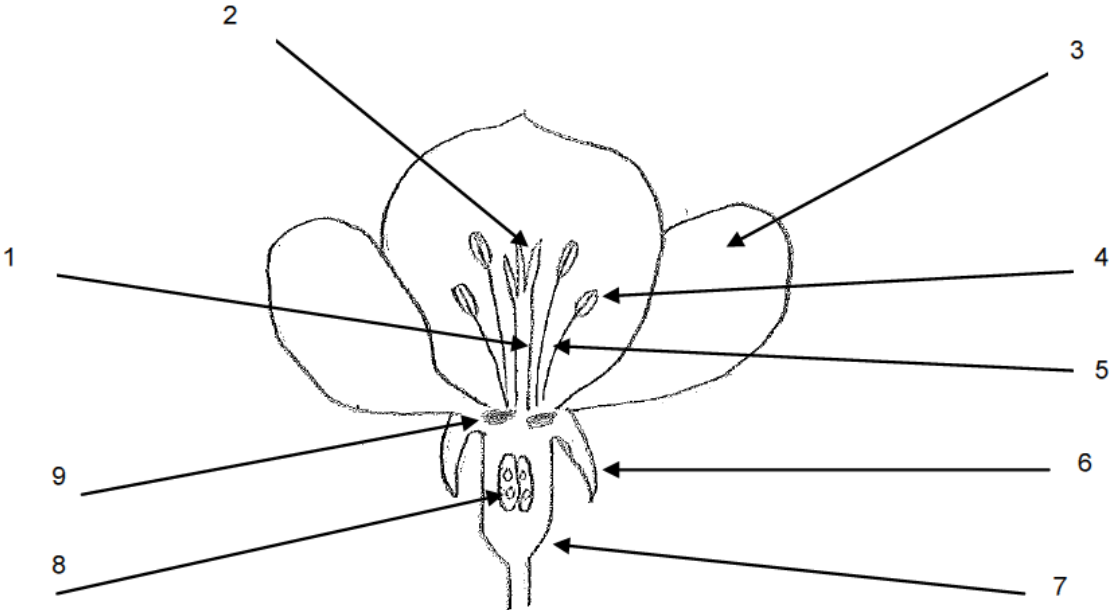
- | | | | |
|-----|-----|---|----|
| Q16 | (a) | Give the name and function of the 9 parts of the flower in the diagram provided. | 9 |
| | (b) | Give an account of the processes of pollination and fertilisation, distinguishing between the two. | 11 |
| | (c) | Define and discuss the advantages of self- and cross- pollination, and the mechanisms by which plants promote cross fertilisation. | 10 |
| Q17 | (a) | Describe, with reasons, how to prepare oil seed rape honey, following extraction, for storage in bulk containers. This honey will be used at a later date for processing and bottling soft set honey. | 7 |
| | (b) | Discuss the storage of this honey, referring to the principles of honey storage. | 8 |
| | (c) | Describe the preparation of clear honey from a 10 litre container of blackberry honey. This honey is intended for retail sale. | 15 |

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Q16 (a) Give the name and function of the 9 parts of the flower in the diagram below.

9



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

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EXAMINATION FOR PROFICIENCY IN APICULTURE

MODULE 2 HONEYBEE PRODUCTS AND FORAGE

19th March 2016 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.

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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 two types of honey extractor.
- Q2 What is the term given to the property of honey to absorb water?
- Q3 What is the maximum permissible amount of sucrose in borage honey?
- Q4 What does the Schade scale measure?
- Q5 Name a substance found in honeydew honey, which is not found in floral honey.
- Q6 What is the temperature at which beeswax may become discoloured?
- Q7 Give one criterium by which floral honey should be labelled as Baker's Honey.
- Q8 To what temperature should liquid honey be heated and for how long, to extend its shelf life?
- Q9 What is Melomel?
- Q10 Give one example of a dioecious plant.

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MODULE 2 HONEYBEE PRODUCTS AND FORAGE

19th March 2016

SECTION B (60 marks, 15 for each question)

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

Marks

- Q11 (a) List the characteristics of honey bees and honey bee colonies which make them good pollinators. 6
- (b) Distinguish between pollination and fertilisation. 2
- (c) How do each of the flowers of forget-me-not, horse chestnut and clover indicate to bees that, having been successfully pollinated, their visits are no longer required? 3
- (d) What are nectar guides and what is the significance of the spectrum of vision of honey bees? 4
- Q12 Fermentation spoils honey.
- (a) What is the process including the chemical equation? 2
- (b) List the effects on the honey. 5
- (c) List the steps that the small scale beekeeper should take to reduce the risk of fermentation of their honey. 8
- Q13 (a) Describe how cut comb is produced and offered for sale. Exclude the management of the bees in your answer. 8
- (b) List the points a judge would consider when judging a cut comb class at a honey show. 7
- Q14 (a) Other than honey and wax, list four other products which beekeepers can harvest from a hive. 4
- (b) Give two uses for each of two of the products mentioned in (a) 4
- (c) List the necessary components of a well designed solar wax extractor. 6
- (d) What is the main advantage of a solar wax extractor? 1
- Q15 (a) What is meant by a thixotropic honey? 1
- (b) From which floral source does it come in the UK? 1
- (c) Which constituent of the honey gives it this property? 1
- (d) List the methods used to extract and jar this honey and the difficulties which may be encountered. 4
- (e) In what other form could this honey be sold? 2
- (f) List 6 items which must be included on a suitable label for a 454g jar of honey to be sold from a retail outlet. 6

SECTION C (30 marks)

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

- Q16 (a) Discuss the factors which influence nectar secretion, giving examples where appropriate. 15
- (b) Outline the process by which honeybees collect nectar, convert it into honey, and ripen and store the honey. Include one chemical equation in your answer. 15
- Q17 Discuss the requirements in design, construction, furnishing and equipping, and the use, including legislative requirements, of a honey house for a beekeeper running 10 honey producing colonies. 30

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12th November 2016 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.

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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 is the common name for *Brassica napus*?
- Q2 What is the minimum height of the weight numerals to be printed on the label of a 454g jar of honey?
- Q3 What temperature (°C) is recommended for the optimum and rapid granulation of Honey?
- Q4 What is the main enzyme forager bees add to nectar?
- Q5 Name the main disaccharide that is present in nectar?
- Q6 What is the melting point of beeswax in °C?
- Q7 How many ovaries does an apple flower have?
- Q8 What does HMF stand for?
- Q9 What is the word used to describe the analysis of pollen in honey, in particular to establish the source of the pollen?
- Q10 After filtering, why is honey allowed to 'settle' for a period of time prior to bottling?

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MODULE 2 HONEYBEE PRODUCTS AND FORAGE

12th November 2016

SECTION B (60 marks, 15 for each question)

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

- Q11 (a) List the common names of 4 plants that have extra floral nectaries. 4
(b) For these plants listed describe the extra floral nectaries and state exactly where they are located. 8
(c) Name 3 plants in the UK whose nectar produces unpalatable honey. 3
- Q12 (a) For honey destined to be sold: name two types of extractor that can be used to process floral honey and a piece of equipment to extract ling heather honey. 3
(b) Compare the two commonly used centrifugal methods of extraction, giving their respective advantages and disadvantages. 10
(c) Under Food Regulations, of what materials can a honey extractor be made? 2
- Q13 (a) On the diagram provided label parts A to J. 5
(b) Describe briefly the role of A, D, F, G and J. 10
- Q14 (a) List 5 physical properties of beeswax, giving values where appropriate. 5
(b) Describe briefly the process of recovering beeswax and usable honey from 10kg of wet cappings. The honey ending up in a bucket and the beeswax made into blocks suitable for exchange into sheets of foundation. Include temperatures in °C and approximate time durations. 10
- Q15 Briefly describe the process by which nectar is collected, returned to the hive, ripened as honey and stored. The mechanism of finding forage is not to be included. 15

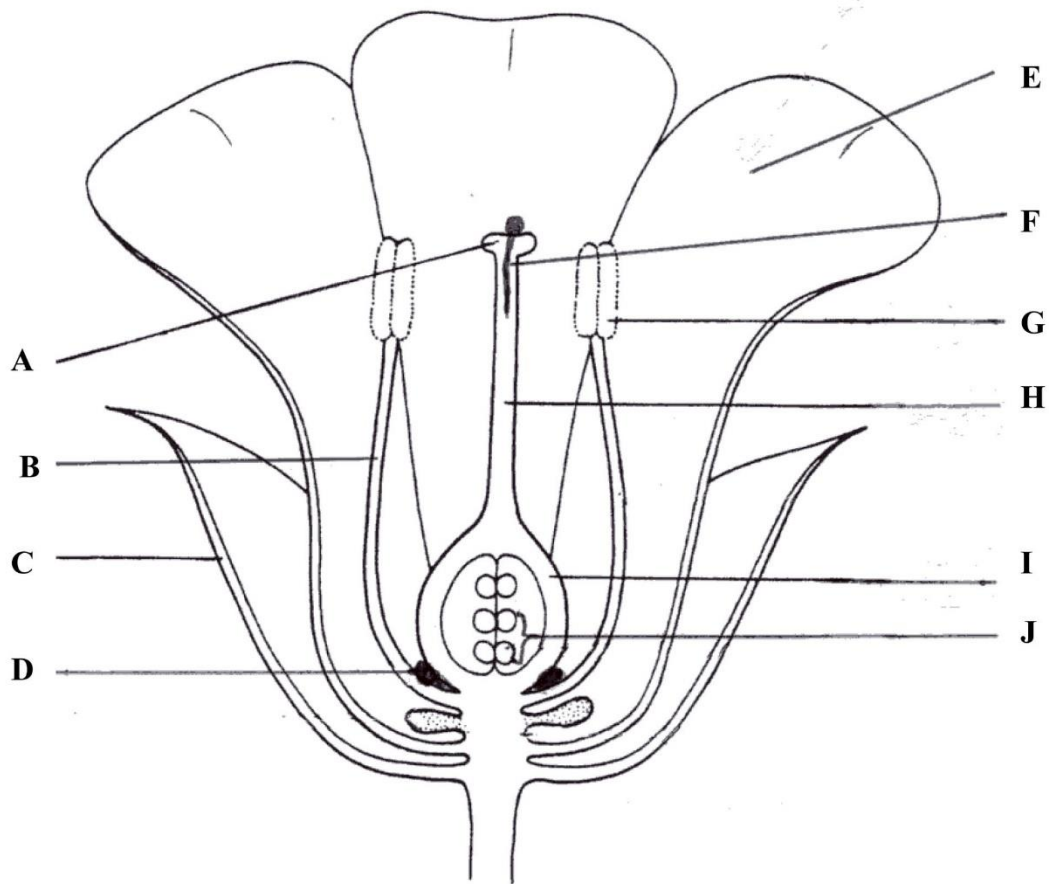
SECTION C (30 marks)

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

- Q16 (a) Explain the terms pollination and fertilisation, including the terms self-pollination and cross-pollination. 6
(b) Discuss why Cross pollination is important. 3
(c) Describe in detail the process of fertilisation within a flower, from the point of successful pollination. 14
(d) Explain the different methods used by plants to ensure cross pollination. Give an example of a plant for each method. Identify a major risk of cross pollination and state how some plants have adapted to mitigate against this risk. 7
- Q17 (a) What should an Environmental Health Officer expect to see when visiting a small scale beekeeper, where honey is extracted in the kitchen? 15
(b) Distinguish between the process for producing naturally granulated honey and soft set honey using oil seed rape honey. 15

MODULE 2 HONEYBEE PRODUCTS AND FORAGE

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Q 13 Label parts A to J on the above diagram.

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

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MODULE 2 HONEYBEE PRODUCTS AND FORAGE

18th March 2017 Time Allowed 1½ hours

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Mark									
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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 is the optimum temperature for storage of honey?
- Q2 Give one of the physical properties of beeswax.
- Q3 Name one way humans use venom.
- Q4 Name an important pollen producing plant in autumn.
- Q5 State how a horse chestnut flower can indicate to bees that it has been pollinated.
- Q6 Which part of a flower protects the bud prior to the flower opening?
- Q7 State the location of the extra-floral nectaries of the plum.
- Q8 Name a plant that is a source of unpalatable honey.
- Q9 Give the chemical equation of the process of changing nectar into honey.
- Q10 Name one of the sugars present in honeydew that is not normally present in floral honey.

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MODULE 2 HONEYBEE PRODUCTS AND FORAGE

18th March 2017

SECTION B (60 marks, 15 for each question)

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

- Q11 (a) Define soft set honey. 3
(b) List the steps necessary to convert a 30lb (10litre) tub of blackberry honey into 454g jars of soft-set honey. Some oil seed rape honey is available. 12
- Q12 List the factors affecting nectar secretion, using an example to illustrate each of your points. 15
- Q13 In relation to honey, write short notes on:
(a) viscosity; 4
(b) specific gravity; 5
(c) electrical conductivity. 6
- Q14 (a) List the physical properties of beeswax. 5
(b) Outline how the wax from used combs and clean cappings can be recovered. 7
(c) List 3 uses of beeswax. 3
- Q15 Give an account of the processes of :
(a) pollination; 3
(b) fertilisation in flowering plants. 12
Include a definition of these processes in your answer.

SECTION C (30 marks)

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

- Q16 Write an account of the UK statutory regulations affecting the handling and the preparation of honey for sale. Use the following headings:
(a) name of the regulation and date of coming into force; 2
(b) definition of honey and different types of honey; 9
(c) general compositional criteria; 10
(d) detailed compositional criteria. 9
- Q17 (a) What current UK legislation affects the suitability and condition of the premises used for bottling honey for sale to retail outlets? 1
(b) What are the requirements for a beekeeper to extract small quantities of honey in a domestic kitchen? 14
(c) What are the additional legal requirements for the equipment for extracting, processing and for preparing honey for sale to retail outlets? 15

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11th November 2017 Time Allowed 1½ hours

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Mark									
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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 does a beekeeper use a refractometer for?
- Q2 How will a clover flower indicate that it has been pollinated?
- Q3 What is metheglin?
- Q4 Name two types of honey extractor.
- Q5 What sort of plastic should honey storage buckets be made of?
- Q6 Name a factor which can affect nectar secretion in a plant.
- Q7 What is the maximum permissible water content for heather (*Calluna*) honey?
- Q8 In what does a worker bee transport pollen back to the hive?
- Q9 What does the Schade scale measure?
- Q10 What is the name given to the black cross that is produced when the wax from used frames is melted?

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MODULE 2 HONEY BEE PRODUCTS AND FORAGE

11th November 2017

SECTION B (60 marks, 15 for each question)

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

Marks

- Q11 (a) List the factors which affect honey stored in buckets. 5
(b) (i) Why does fermentation in honey occur? 3
(ii) What are the products of fermentation? 1
(c) Why is liquid honey less likely to ferment than granulated honey? 2
(d) What should a small scale beekeeper do to ensure only ripe honey is extracted? 4
- Q12 (a) Distinguish between pollination and fertilization. 2
(b) List two advantages and two disadvantages of self-pollination. 4
(c) List and briefly explain the mechanisms a plant may use to ensure cross pollination. 5
(d) Using common names give an example of a plant for two of the mechanisms you have listed. 4
- Q13 (a) Apart from honey, name five products a beekeeper may collect from the hive. 5
(b) For each product listed in (a), give one human use. 5
(c) For each product listed in (a), give one use in the colony. 5
- Q14 Starting with a bucket of undrained wax cappings from recently extracted supers, describe the steps and precautions which should be taken to produce a bottle of mead for the show bench. Quantities for ingredients need not be given. 15
- Q15 (a) Clearly label 10 features on the diagram provided. 5
(b) What purpose do the sepals of a flower serve? 1
(c) (i) Name three plants which have extra floral nectaries. 3
(ii) What are extra floral nectaries and what purpose do they serve? 3
(iii) By means of a simple diagram indicate the location of the extra floral nectaries on one of the plants listed in (i) and show the name of the plant on the diagram. 3

SECTION C (30 marks)

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

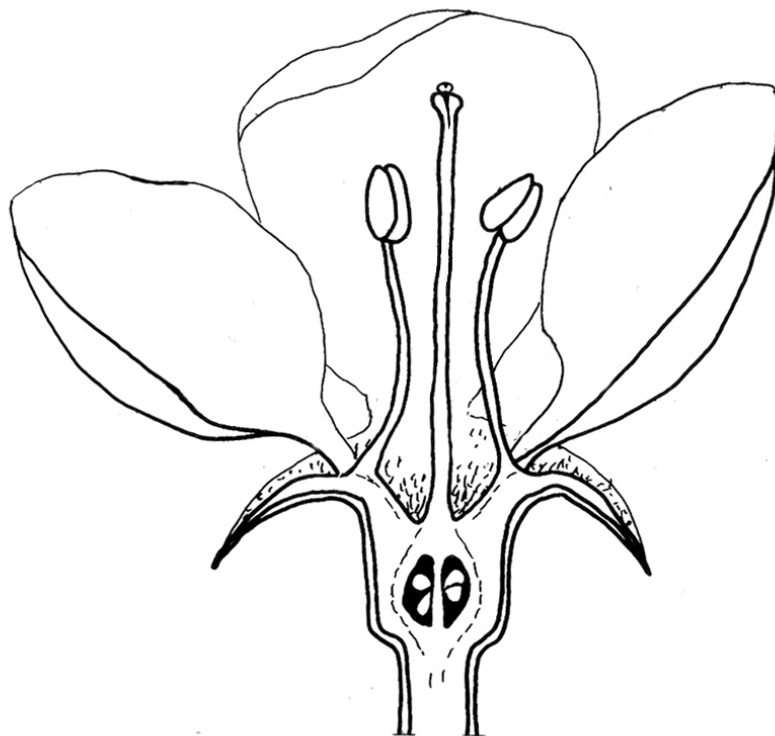
- Q16 (a) From the point at which a worker bee collects nectar from a flower describe how the nectar is transported back to the hive, processed into honey and stored in the hive. Give details of the chemicals used and include a chemical equation in your answer. 18
(b) How is honeydew produced on a plant? 3
(c) What is honeydew composed of? 5
(d) Briefly outline how honey might be tested to determine its geographic origin and in what circumstances may this give a misleading result, a detailed description of the testing process is not required. 4
- Q17 Starting with a super of capped frames of liquid honey, which have been brought straight from the hive, describe how a small scale beekeeper produces jars of clear honey for sale. State the precautions which need to be taken at each stage of the process. 30

MODULE 2 HONEY BEE PRODUCTS AND FORAGE

11th November 2017

Q15 (a) Clearly label 10 features on the diagram below.

5



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