

BRITISH BEEKEEPERS' ASSOCIATION
MODULE 3 HONEYBEE DISEASES, PESTS AND POISONING
Sample Paper Marking Scheme

- Marks should only be awarded for points which answer the question.
- The allocation of points to be included are a guide to what should be included and are not necessarily definitive.
- Where more points are provided than the number requested eg 8 points when only 6 are asked for, then first 6 answers should be taken.
- 0 marks if answer doesn't work
- Do not penalise poor spelling so long as the meaning is clear other than technical terms.
- **How the answer is phrased is not important but that aspect must be understood from the answer rather than just mentioning the words.**

SECTION A: (10 marks, 1 for each question)

- Q1 How many statutory notifiable pests and diseases are there in the UK?
A 4
- Q2 Which out of the foul brood disease causing organisms form spores?
A AFB
- Q3 What is the size of a Nosema spore?
A 2-4 by 4-6 μm (accept within this range)
- Q4 What does IPM stand for?
A Integrated Pest Management
- Q5 *Aethina tumida* is commonly known as the _____?
A Small hive beetle/SHB
- Q6 What size samples of bees should be taken in the case of a spray damage incident?
A (3 samples of) 200-300
- Q7 Name the mite species that is notifiable in Europe.
A Tropilaelaps
- Q8 Who would issue a statutory standstill order?
A SBI/Bee inspector/NBU
- Q9 What type of microscope would you recommend for the diagnosis of Amoebiasis?
A Compound/one with (at least) 400X
- Q10 Several viruses such as DWV are associated with Varroosis. Name one other
A CBPV/ BQCV/IAPV/KBV/SBPV/Varroa destructor macula-like virus/Varroa destructor virus.

Section B

- Q11 (a) List 5 identifying features/characteristics of the Asian Hornet. 5
- (b) In some areas of the country Varroa mites have become resistant to synthetic pyrethroid varroacides. Describe a method to determine if there are resistant mites in an apiary. Include in your answer how the results are interpreted. 10

(a) List 5 identifying features/characteristics of the Asian Hornet. 5 Marks

1. Legs yellow at ends,
2. head black from above and orange face,
3. thorax black and velvety,
4. orange band on abdomen,
5. never active at night.

1 mark for each line Max 5

(b) In some areas of the country Varroa mites have become resistant to synthetic pyrethroid varroacides. Describe a method to determine if there are resistant mites in an apiary. Include in your answer how the results are interpreted. 10 Marks

1. Beltsville test
2. Description of container with sticky paper at end
3. Insert/hang a small length (9 by 25mm strip) of Apistan (Bayvarol) in centre
4. Shake sufficient bees (1-2 combs) into upturned roof or similar (avoid the queen)
5. Scoop up ¼ cup (150-200) of bees into container
6. Turn upside down and store in cool dark place for 24 hours
7. Shake to dislodge dead mites
8. Remove sticky paper & count
9. Place container upright in freezer 24 hrs to kill bees
10. Shake container over white paper and count remaining mites
11. % kill = first count/first + second count
12. If less than 50% indicates have resistance.

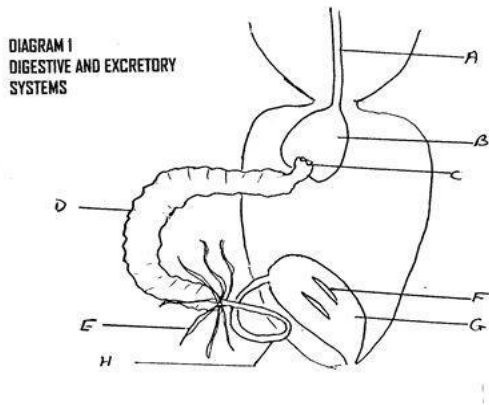
NBU variation

- 200 bees
- Leave 4 hours
- Count first drop
- Kill bees in soapy water
- Wash mite off with stream of water in coarse sieve and collected in fine sieve

1 mark for each line Max 10

- Q12 (a) Examine the diagram of the bee's alimentary canal provided and identify parts A to E. 5
- (b) Name a disease causing organism that would be found in part E. 1
- (c) Which virus is associated with this disease? 1
- (d) What affect does this organism have on an individual bee and the colony? 4
- (e) What authorised treatments are available for this disease? 1
- (f) Which management techniques can be used if this disease is diagnosed in a colony. Details of the procedures are not needed. 3

12 (a) Examine the diagram of the bee's alimentary canal and identify parts A to E. 5 Marks



- A Oesophagus
B Crop
C Proventricular valve
D Ventriculus
E Malpighian tubules

1 mark for each correct answer

(b) Name a disease causing organism that would be found in part E. 1 Mark

1. Malpighamoeba mellifica 1 mark

(c) Which virus is associated with this disease? 1 Mark

1. Bee virus X 1 mark

(d) What affect does this organism have on an individual bee and the colony? 4 Marks

- Bee
1. causes mild dysentery
 2. Shortens life
 3. More cleansing flights
- Colony
4. Slow spring build-up
 5. Normally little effect
- 1 mark per line to a maximum of 4*

(e) What authorised treatments are available for this disease? 1 Mark

1. None 1 mark

**(f) What management techniques can be used if this disease is diagnosed in a colony. 3 Marks
Details of the procedures are not needed.**

1. Comb change
 2. Fumigation of combs/supers
 3. Good apiary/hive hygiene
 4. Strong well fed colonies
- 1 mark per line to a maximum of 3*

- Q13 (a) Name two diseases whose presence in a hive can be confirmed using a LFD?
Give both common and scientific name for each of these organisms. 2
- (b) Outline the authorised treatments that would be carried out for each of these diseases by the statutory body. 13

Q 13 (a) Name two diseases whose presence in a hive can be confirmed using a LFD?

Give both common and scientific name for each of these organisms. 2 Marks

1. AFB *Paenibacillus larvae*
2. EFB *Melissococcus plutonius*.

They must link the common to the correct scientific name.

1 Mark for each line Max 2 marks

(b) Outline the authorised treatments that would be carried out for each of these diseases by the statutory body. 13 Marks

EFB

1. Destroy colony if severe or beekeeper requests
2. Shook swarm
3. New box/floor/roof/queen excluder, Complete set of new frames with foundation
4. Shake all bees into new box, helps to have funnel or make room by...
5. After 24-48hrs feed colony strong syrup until comb drawn out
6. Burn all comb from infected boxes **including super frames**, Flame boxes etc
7. Treated with antibiotic if season unsuitable for shook swarm

1 Mark each line max 7

AFB

1. After ceased flying in evening and closed up
2. Kill colony with pint of petrol
3. Dig deep pit
4. Throw in all bees, comb, honey and burn
5. All boxes and equipment scorched, inside and out
6. All other equipment washed in hot washing soda water

1 Mark each line Max 6

Q14	(a)	Which species of woodpecker attacks hives?	1
	(b)	Describe a method of protecting hives from woodpecker damage.	3
	(c)	When would you recommend fitting such protection.	1
	(d)	Describe the life cycle of the greater wax moth.	10

Q 14 (a) Which species of woodpecker attacks hives? 1 Mark

1. Green wood pecker/*Picus viridis*
1 mark

(b) Describe a method of protecting hives from woodpecker damage. 3 Marks

1. Surround hive with wire cage or other suitable protection
2. Must be proud of hive so as not to give perch
3. Protect roof if felted

1 mark for each max 3 marks (3.26)

(c) When would you recommend fitting such protection. 1 Mark

1. Autumn/October-November/before first frost
1 Mark

(d) Describe the life cycle of the greater wax moth. 10 Marks

1. After hatching moths leaves hive
2. Male moth produces pheromone to attract female
3. And ultrasonic sound
4. Mate
5. Female enters hive/stored comb
6. Lay several 100 creamy white eggs in crevices/cracks
7. After few days hatch in to larva
8. After 4 weeks
9. Scoop out depression in wood or under top bar to pupate
10. After 7 days emerge as adult moth
11. Times vary due to temperature!

1 Mark each line Max 10 Marks

- Q15 (a) Name one field crop which may be treated with a chemical hazardous to bees? 1
 (b) A beekeeper has been notified by the farmer that he intends to spray a crop next to their apiary. List the step(s) the beekeeper should take to protect their bees? 12
 (c) The BBKA has two schemes to aid beekeepers avoid spray damage. Name both. 2

Q 15 (a) Name one field crop which may be treated with a chemical hazardous to bees? 1 Mark

1. Field beans/OSR /others

1 mark

(b) A beekeeper has been notified by the farmer that he intends to spray a crop next to their apiary. List the step(s) the beekeeper should take to protect their bees? 12 Marks

If can move bees

1. Seal up in evening prior to spraying and move to a new site over 3 miles away
2. Once spraying over and danger passed return

If cannot move bees

3. On evening prior to spraying seal bees in after flying over
4. Provide ventilation
5. Cover entrance so not light
6. or bees clamour to get out
7. Remove OMF slide/fit ventilation screen
8. Add extra super for extra room
9. Add feeder with water/weak syrup
10. Throw net over hives to shade
11. Spray water on hives
12. Later in evening after spraying over or early next morning release

1 Mark each line Max 12 marks

(c) The BBKA has two schemes to aid beekeepers avoid spray damage.

Name both. 2 Marks

1. Spray Liaison scheme
2. BeeConnected

1 Mark for each

Section C – 30 marks each -choose one

- Q16
- | | | |
|-----|---|----|
| (a) | What signs exhibited by a colony might suggest it is suffering from Acarapisosis? | 6 |
| (b) | Name the causative organism. | 1 |
| (c) | To which group of animals does it belong? | 1 |
| (d) | Describe this organism and exactly where is it found in the bee? | 5 |
| (e) | When taking a sample of bees to confirm Acarapisosis which bees should be selected and why? | 2 |
| (f) | Using an appropriate sample of freshly killed bees, describe in detail how to confirm this disease in the laboratory. | 10 |
| (g) | What treatments and management techniques are available to deal with this organism? | 5 |

**Q 16 (a) What signs exhibited by a colony might suggest it is suffering from Acarapisosis?
6 Marks**

1. Large number of bees clustering in front of the hive.
2. Appearing confused and disorientated
3. Unable to return to the colony.
4. Large numbers of bees may also be seen crawling up stems of grass
5. K wings
6. Slow spring build-up

1 mark per line to a maximum of 6 marks

(b) . Name the causative organism. 1 Mark

1. *Acarapis woodi* 1 mark

(c) To which group of animals does it belong? 1 Mark

1. Mites/Arachnids 1 mark

(d) Describe this organism and exactly where is it found in the bee? 5 Marks

1. They have white oval bodies with a shiny,
2. Smooth cuticle.
3. There are several long fine hairs on the body and legs
4. The mouthparts are beak-like and elongated.
5. 125 - 150µm long
6. 60 - 80µm wide
7. Found in first Tracheal branch in the thorax

1 mark for each max 2 marks

(e) When taking a sample of bees to confirm Acarapisosis which bees should be selected and why? 2 Marks

1. Older bees/foragers
 2. So more likely to have large number of mites and damage will show
- 2 marks*

(f) Using an appropriate sample of freshly killed bees, describe in detail how to confirm this disease in the laboratory. 13 Marks

1. Pin bee on its back, through thorax
2. On acarine slope or similar

3. Description or drawing (in drawing marks)
4. Double pin, so bee does not spin
5. Remove head and first pair of legs
6. Examine at times 20/40, under dissecting microscope
7. Expose prothoracic collar, remove collar with fine forceps
8. Expose first pair of trachea
9. If creamy white OK
10. If dark patchy discolouration, then infected

Max 10 marks

(g) What treatments and management techniques are available to deal with this organism?

5

1. No recognised treatment
2. Varroa controls should help
3. Keep strong colonies
4. Re-queen with resistant strain
5. Reduce drifting

1 mark for each 5 Marks

- Q 17 You have a small weak colony which is suffering from Nosemosis.
- | | |
|--|----|
| (a) Name the possible causative organisms. | 2 |
| (b) Which group of organisms do they belong to? | 1 |
| (c) Describe a suitable treatment regime for this colony. | 17 |
| (d) Drawn comb is a valuable resource. Outline how stored supers of drawn comb can be treated to reduce the likelihood of them containing pathogens. | 10 |

Q 17. You have a small weak colony which is suffering from Nosemosis.

(a) Name the possible causative organisms. 2 Marks

1. *Nosema apis*
2. *Nosema ceranae*

2 marks

(b) Which group of organisms do they belong to? 1 Mark

1. Fungi/microsporidia 1 mark

(c) Describe a suitable treatment regime for this colony. 17

1. Not shook swarm
 2. Modified Bailey comb change
 3. Prepare new clean box with new frames of drawn comb (if possible)
 4. Open infected colony, find the queen and cage her
 5. Remove all non-brood containing combs – destroy or fumigate
 6. Select the best brood containing frame, mark with pin or other mark
 7. Place it in the centre of the new box, surround with new frames of drawn comb
 8. In old box slide remaining combs to one side/centre and use dummy board either side
 9. Place queen excluder on top of old box
 10. Place eke with entrance (facing same way) on queen excluder
- (Could describe special Bailey board sold)
11. Close lower entrance
 12. In new box match number frames so match those below, close space with dummy board
 13. Release queen into top box
 14. Close up
 15. Feed 1 gal syrup 2:1
 16. Once queen laying on new frames move marked into lower box
 17. Leaving queen above
 18. Once all brood emerge in lower box take away and burn or render/sterilise
 19. Remove old floor and site on new clean floor after removing eke and excluder

1 mark per line to a maximum of 17 marks

(d) Drawn comb is a valuable resource. Outline how stored supers of drawn comb can be treated to reduce the likelihood of them containing pathogens. 10 Marks

1. 80% ethanoic acid or sulphur strips
2. Scrape all woodwork free of propolis and wax
3. Coat metal parts with Vaseline or remove
4. Place clean hive floor on ground - entrance sealed
5. Build stack of boxes with pad containing 140ml acetic acid between each box or on top

6. Ekes may be required
7. Close stack with crown board and roof
8. Seal stack with tape or polythene wrap
9. Open stack after one week (longer in cold weather)
10. Air boxes for two days

1 mark per line to a maximum of 10