UNIVERSITI SAINS MALAYSIA

Second Semester Examination
Academic Session 2008/2009

April/Mei 2009

BGT 314/4 – Insect Pest Management and Control
[Pengurusan dan Pengawalan Serangga Perosak]

Duration: 3 hours
[Masa : 3 jam]

Please ensure that this examination paper contains EIGHT printed pages before you begin the examination.

[Sila pastikan bahawa kertas peperiksaan ini mengandungi LAPAN muka surat yang bercetak sebelum anda memulakan peperiksaan ini.]

Instructions: Answer **FIVE** (5) out of **SIX** (6) questions, in English or Bahasa Malaysia. Each question carries 20 marks.

*[**Arahan:** Jawab **LIMA** (5) daripada **ENAM** (6) soalan yang diberikan dalam Bahasa Inggeris atau Bahasa Malaysia. Tiap-tiap soalan bernilai 20 markah.]*

...2/-

1. By using suitable examples, discuss the evolution of pest control strategies from pre-historic times to the present.

(20 marks)

2. [a] By using suitable examples, define the term 'pest'.

(5 marks)

[b] Discuss **FIVE** (5) important steps that must be incorporated into an integrated pest management programme (IPM)?

(15 marks)

3. [a] What are the **FIVE** (5) assumptions of Lincoln Index that must be fulfilled before an estimation of an insect population can be made ?

(10 marks)

[b] You would like to estimate American cockroach population in the cafeteria of Desasiswa Aman in USM. You placed glass jar traps at various locations at the cafeteria and collected them after three days. In the first trapping, you caught 307 cockroaches (alive: 299, and the remaining had died). You marked them, and released them back into the original population. At the second trapping, 441 cockroaches were trapped (but 5% of them are dead). Of this number, a total of 35 cockroaches (alive: 25 and dead: 10) were marked. By using Lincoln index, estimate the population size of cockroaches in the mentioned cafeteria.

(10 marks)

4. Compare and differentiate emulsifiable concentrates (EC), wettable powder (WP) and microencapsulated (ME) formulations.

(20 marks)

5. Write short notes for the following:

[i] Plant Quarantine Act 1976.

[ii] Crop rotation.

[iii] Cockroach bait.

[iv] Genetic manipulation.

[v] Predator as biocontrol agent.

(20 marks)

6. You are an entomologist working in a household insecticide company in Penang. In an experiment, you evaluated an aerosol formulation against three strains of *Blattella germanica*, and obtained the following results:

Time (minutes)	Cockroach strain (% killed)		
	A	B	C
5	0	3	0
10	1	15	0
15	6	37	0
20	15	68	4
25	34	85	10
30	59	98	24
40	77	100	38
60	95	100	54
90	100	100	76
120	100	100	93
150	100	100	100

[a] By using the enclosed probit paper, determine LT_{50} dan LT_{95} values.

(10 marks).

[b] In your opinion, which cockroach strain has a heterogenous population, and explain why.

(5 marks)

[c] By choosing the most susceptible strain, determine the resistance ratios of the other two strains.

(5 marks)

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1. Dengan menggunakan contoh yang sesuai, bincang evolusi strategi kawalan perosak dari zaman purba ke masa kini.

(20 markah)

2. [a] Dengan menggunakan contoh yang sesuai, takrifkan istilah 'perosak'.

(5 markah)

[b] Bincang **LIMA** (5) langkah penting yang mesti dirangkumi ke dalam satu program pengurusan perosak bersepadu (PPB)?

(15 markah)

3. [a] Apakah **LIMA** (5) andaian indeks Lincoln yang mesti dipatuhi sebelum satu penganggaran terhadap suatu populasi serangga boleh dilakukan?

(10 markah)

[b] Anda ingin mengganggarkan populasi lipas di kafetaria desasiswa Aman di USM. Anda meletakkan perangkap jar kaca di pelbagai tempat di kafetaria tersebut dan mengutipnya kembali selepas tiga hari. Dalam tangkapan pertama, anda mendapat 307 ekor lipas (299 hidup dan bakinya mati). Anda menandakannya dan melepaskan semula ke dalam populasi asal. Pada tangkapan kedua, 441 ekor lipas ditangkap (tetapi 5% daripadanya mati). Daripada bilangan ini, sebanyak 35 ekor lipas (hidup: 25 dan mati: 10) adalah bertanda. Dengan menggunakan indeks Lincoln, anggarkan saiz populasi lipas di kafetaria tersebut.

(10 markah)

4. Banding dan bezakan formulasi emulsi terpekat (EC), serbuk terbasah (WP) dan mikroenkapsulasi (ME).

(20 markah)

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5. Tulis nota ringkas untuk berikut:

[i] Akta Kuarantin Tumbuhan 1976.

[ii] Tanaman bergilir.

[iii] Umpan lipas.

[iv] Manipulasi genetik.

[v] Pemangsa sebagai agen kawalan biologi.

(20 markah).

6. Anda ialah seorang ahli entomologi di sebuah syarikat insektisid isi rumah di Pulau Pinang. Dalam satu eksperimen, anda menilai satu formulasi aerosol ke atas tiga strain *Blattella germanica* dan mendapat keputusan seperti di bawah:

Masa (minit)	Strain lipas (% dibunuh)		
	A	B	C
5	0	3	0
10	1	15	0
15	6	37	0
20	15	68	4
25	34	85	10
30	59	98	24
40	77	100	38
60	95	100	54
90	100	100	76
120	100	100	93
150	100	100	100

[a] Dengan menggunakan kertas probit yang dilampirkan, tentukan nilai LT_{50} dan LT_{95}.

(10 markah)

[b] Pada pendapat anda, yang manakah strain lipas yang mempunyai populasi heterogenus dan terangkan mengapa.

(5 markah)

[c] Dengan memilih strain yang paling rentan, tentukan nisbah kerintangan untuk dua strain yang lain.

(5 markah)

...8/-

Angka Giliran: _____