UNIVERSITI SAINS MALAYSIA

Second Semester Examination
Academic Session 2013/2014

June 2014

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 <u>FIVE</u> printed pages before you begin the examination.

[Sila pastikan bahawa kertas peperiksaan ini mengandungi <u>LIMA</u> 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.

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

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

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

(5 marks / 5 markah)

[b] You would like to estimate the German cockroach population in an infested cafeteria in a school. You placed glass jar traps at various locations at the cafeteria and collected them after three days. In the first trapping, you caught 745 cockroaches (alive: 700, and the remaining had died). You marked them, and released them back into the original population. At the second trapping, 500 cockroaches were trapped (but 5% of them were dead). Of this number, a total of 87 cockroaches (alive: 80 and dead: 7) were marked. By using Lincoln index, estimate the population size of cockroaches in the cafeteria.

[Anda ingin mengganggarkan populasi lipas Jerman di sebuah kafetaria yang terinfeksi di suatu sekolah. Anda meletakkan perangkap balang kaca di pelbagai tempat di kafetaria tersebut dan mengutipnya kembali selepas tiga hari. Dalam tangkapan pertama, anda mendapat 745 ekor lipas (700 hidup dan bakinya mati). Anda menandakannya dan melepaskan semula ke dalam populasi asal. Pada tangkapan kedua, 500 ekor lipas ditangkap (tetapi 5% daripadanya mati). Daripada bilangan ini, sebanyak 87 ekor lipas (hidup: 80 dan mati: 7) adalah bertanda. Dengan menggunakan indeks Lincoln, anggarkan saiz populasi lipas di kafetaria tersebut.]

(8 marks / 8 markah)

[c]   To manage the German cockroach population in the cafeteria as in (b), you are given a suspended concentrate (SC) formulation containing 2% deltamethrin and a 10-liter spray equipment to carry out the treatment. The total treatment area is 195 m^2 and the recommended treatment concentration is 20 mg a.i./m^2. If 50 ml is required to spray on an area of 1 m^2, calculate the volume of insecticide formulation needed for the dilution of the treatment.

[Untuk mengurus populasi lipas Jerman di kafetaria tersebut dalam (b), anda diberi suatu formulasi ampaian terpekat (SC) yang mengandungi 2% deltametrin dan suatu alat penyembur 10-liter untuk menjalankan rawatan tersebut. Jumlah keluasan ruang rawatan ialah 195 m^2 dan kepekatan rawatan yang dicadangkan ialah 20 mg a.i./m^2. Sekiranya 50 ml diperlukan untuk menyembur suatu ruang 1 m^2, kira amaun formulasi insektisid yang diperlukan untuk pencairan rawatan tersebut.]

(7 marks / 7 markah)

2.   Write short notes for the following:

[Tulis nota ringkas untuk berikut:]

[a]   Pesticides Act 1974.

[Akta Racun Perosak 1974.]

[b]   Perfectly density-dependent factors.

[Faktor-faktor bersandar ketumpatan sempurna.]

[c]   Cockroach bait.

[Umpan lipas.]

[d]   In situ counting.

[Pengiraan in situ.]

(20 marks / 20 markah

3. With the aid of suitable population diagrams, discuss **THREE** (3) kinds of insect pest populations and the strategies that could be used to manage them.

    [Dengan bantuan gambarajah populasi yang sesuai, bincangkan TIGA (3) jenis populasi serangga perosak dan strategi yang boleh digunakan dalam pengurusannya.]

    (20 marks /20 markah)

4. Discuss a program of termite control in sustainable manner in an oil palm plantation.

    [Bincangkan suatu program kawalan anai-anai secara lestari dalam suatu ladang kelapa sawit.]

    (20 marks /20 markah)

5. [a] What are the advantages of biological control?

    [Apakah kebaikan kawalan biologi?]

    (5 marks / 5 markah)

    [b] As an estate manager of a matured oil palm plantation, formulate an IPM program to manage pests of oil palm utilizing biological control tactics.

    [Sebagai seorang pengurus ladang kelapa sawit yang matang, formulasikan suatu program IPM untuk mengurus perosak kelapa sawit dengan menggunakan taktik kawalan biologi.]

    (15 marks / 15 markah)

6. Discuss the most suitable approaches of implementing IPM programs in short term crops such as vegetables and rice. Compare these approaches to those of IPM programs in perennial crops such as oil palm.

[Bincangkan pendekatan yang paling sesuai untuk mengimplimentasikan program IPM tanaman jangka pendek seperti sayur-sayuran dan padi. Bandingkan pendekatan ini dengan pendekatan program IPM tanaman saka seperti kelapa sawit.]

(20 marks /20 markah)

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