UNIVERSITI SAINS MALAYSIA

Second Semester Examination
Academic Session 2008/2009

April/May 2009

BST 203/3 – Population and Community Ecology
[Ekologi Populasi dan Komuniti]

Duration: 3 hours
[Masa : 3 jam]

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

[Sila pastikan bahawa kertas peperiksaan ini mengandungi LIMA 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.]*

1. Table 1. Fecundity table for the population of house rat, *Rattus rattus*.

x	l_x	m_x		
0-1(0.5)	1.000	0.05		
1-2(1.5)	0.375	1.30		
2-3(2.5)	0.265	1.20		
3-4(3.5)	0.251	2.10		
4-5(4.5)	0.175	2.10		
5-6(5.5)	0.073	2.10		
6-7(6.5)	0.042	2.00		
7-8(7.5)	0.021	2.00		

[a] Calculate the values of rate of increase, r and mean generation time, T_c.

(5 marks)

[b] Complete the fecundity table by filling all the values in the specified columns. Calculate the value of R_o = net reproductive rate; and write your interpretation about the house rat population growth based on the value of R_o.

(15 marks)

2. Discuss the field procedures to conduct a mark recapture study of *Callosciurus notatus* (Plantain Squirrel) in an oil palm plantation and give appropriate mathematical formula and specific assumptions of the method.

(20 marks)

3. [a] Describe the ecological differences between *r*-species and *K* species.

(10 marks)

[b] Describe the most appropriate population model for the current and future trend in human population growth.

(10 marks)

4. Table 1 shows the **THREE** (3) types of species distribution in plant communities. Discuss and calculate the distribution patterns of species a, b, and c.

Table 1 : The distribution of individual species.

	Site									
Species	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
a	2	4	4	1	3	5	5	3	0	3
b	0	8	0	3	0	10	0	0	0	9
c	3	3	3	2	3	4	3	3	3	3

(20 marks)

5. Draw a diagram describing the relationship between relative importance of species and their ranks based on geometric, broken-stick and logonormal distribution.

(20 marks)

6. Based on Ludwig and Reynold (1988) describe interspecific association in a community.

(20 marks)

1. Jadual 1 : Jadual fekunditi untuk populasi tikus rumah, *Rattus rattus*.

x	l_x	m_x		
0-1(0.5)	1.000	0.05		
1-2(1.5)	0.375	1.30		
2-3(2.5)	0.265	1.20		
3-4(3.5)	0.251	2.10		
4-5(4.5)	0.175	2.10		
5-6(5.5)	0.073	2.10		
6-7(6.5)	0.042	2.00		
7-8(7.5)	0.021	2.00		

[a] Kira nilai kadar pertumbuhan, r dan purata tempoh generasi, T_c.

(5 markah)

[b] Lengkapkan jadual fekunditi dengan mengisi setiap kolum yang disediakan. Kira nilai R_o = kadar pertumbuhan bersih; dan berikan interpretasi anda tentang pertumbuhan populasi tikus rumah berdasarkan nilai R_o tersebut.

(15 markah)

2. Bincangkan prosedur-prosedur lapangan untuk menjalankan kajian tangkap tanda lepas dan tangkap semula ke atas *Callosciurus notatus* (Tupai Pinang) di sebuah ladang kelapa sawit dan berikan formula matematik yang bersesuaian dan andaian-andaian untuk kaedah tersebut.

(20 markah)

3. [a] Terangkan perbezaan ekologi antara *r*-spesies dan *K*-spesies.

(10 markah)

[b] Huraikan model populasi bersesuaian untuk corak pertumbuhan populasi manusia pada masa kini dan akan datang.

(10 markah)

4. Jadual 1 menunjukkan **TIGA** (3) jenis taburan spesies di dalam komuniti tumbuhan. Bincang dan kira corak taburan spesies a, b, dan c.

Jadual 1 : Taburan individu spesies

	Tapak									
Spesies	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
a	2	4	4	1	3	5	5	3	0	3
b	0	8	0	3	0	10	0	0	0	9
c	3	3	3	2	3	4	3	3	3	3

(20 markah)

5. Lukiskan gambarajah untuk menjelaskan perhubungan di antara kepentingan relatif spesies dan peringkat mereka berdasarkan taburan geometri, kayu patah dan lognormal susunan.

(20 markah)

6. Berdasarkan Ludwig dan Reynold (1988) terangkan pertalian interspesifik di dalam suatu komuniti.

(20 markah)

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