
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.]

...2/-

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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_0 = net reproductive rate; and write your interpretation about the house rat population growth based on the value of R_0 .

(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)

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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)

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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_0 = kadar pertumbuhan bersih; dan berikan interpretasi anda tentang pertumbuhan populasi tikus rumah berdasarkan nilai R_0 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)

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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)

