★

MODUL PINTAS
TINGKATAN 5 **4551/3**

BIOLOGY
Kertas 3

$1\frac{1}{2}$ jam **Satu jam tiga puluh minit**

PERATURAN PEMARKAHAN
BIOLOGY K3
4551/3

SKEMA MODUL PINTAS BIOLOGI KERTAS 3

<table>
<tr><th>Question</th><th>Mark Scheme</th><th>Marks</th></tr>
<tr><td colspan="3">KB0603 – Measuring Using Number</td></tr>
<tr><td>1(a)</td><td>Able to record all the four readings accurately.
Dapat merekod kesemua (6) bacaan isipadu air kencing dengan tepat.

<table>
<tr><td rowspan="2">Student
Murid</td><td rowspan="2">Salt water concentration (%)
Kepekatan air garam(%)</td><td colspan="2">Volume of urine produced (ml)
Isipadu air kencing yang dihasilkan (ml)</td></tr>
<tr><td>Reading 1 /
Bacaan 1</td><td>Reading 2 /
Bacaan 2</td></tr>
<tr><td>P</td><td>2.0</td><td>88</td><td>79</td></tr>
<tr><td>Q</td><td>4.0</td><td>80</td><td>40</td></tr>
<tr><td>R</td><td>6.0</td><td>55</td><td>30</td></tr>
</table></td><td>3</td></tr>
<tr><td></td><td>Able to record 8- 6 data correctly</td><td>2</td></tr>
<tr><td></td><td>Able to record 5-3 data correctly</td><td>1</td></tr>
<tr><td></td><td>Able to record only 2-0 data or not able to respond / wrong response.</td><td>0</td></tr>
</table>

<table>
<tr><th colspan="3">KB0601 - Observation</th></tr>
<tr><td>1(b)(i)</td><td>Able to state two different observations based on the following criteria:
Dapat menyatakan dua pemerhatian yang betul berdasarkan kriteria berikut :
[Observation must have values / type for MV and RV from Table 1 or comparison between two readings]
[Pemerhatian mestilah mempunyai nilai bagi MV dan RV dari Jadual 1 atau perbandingan antara dua bacaan]

Manipulated variable: (Student P/Q/R//Salt water concentration)
Responding variable: (Volume of urine produced between 2 hours reading 1 and 2(ml)

MV :Murid P/Q/R / Kepekatan air garam (%)
RV :Isipadu air kencing dalam tempoh 2 jam bacaan 1 dan bacaan 2 (ml)</td><td>3</td></tr>
</table>

	Sample answer : *Sampel jawapan:* 1. Student P /When the salt water concentration is 2.0 % , the volume of urine produced between 2 hours are 88 ml in reading 1 and 79 ml reading 2. *Murid P / jika kepekatan air garam 2.0%, isipadu air kencing dalam tempoh 2 jam bacaan 1 adalah 88ml dan bacaan 2 adalah 79ml* 2. Student R / if salt concentration is 6.0%, urine volume within 2 hours reading 1 is 55 ml and reading 2 is 30 ml *Murid R / jika kepekatan air garam 6.0 % , isipadu air kencing dalam tempoh 2 jam bacaan 1 adalah 55 ml dan bacaan 2 adalah 30ml* ‣compulsory to take **both** reading	
	Able to state two observations inaccurately @ without unit *Dapat menyatakan dua pemerhatian tetapi kurang tepat @ tanpa unit* Sample answer : *Sampel jawapan :* 1. Student P / if the salt concentration is 2.0%, the volume of urine is large *Murid P/ jika kepekatan air garam 2.0 % , isipadu air kencing adalah banyak* 2. Student R / if salt concentration is 6.0%, urine volume is low. *Murid R / jika kepekatan air garam 6.0 % , isipadu air kencing adalah sedikit.*	2
	Able to state observations at idea level *Dapat menyatakan dua pemerhatian berbeza pada tahap idea* Sample answer : *Sampel jawapan :* 1. Salt (water) concentration affects the volume of urine is low / low *Kepekatan (air) garam mempengaruhi isipadu air kencing / berkurang*	1
	No response or incorrect response	0

KB0604 - Making inference		
1 (b)(ii)	Able to make two inferences correctly based on **any two** aspects: *Dapat menyatakan dua inferens bagi setiap pemerhatian dengan betul dan tepat mengikut kriteria berikut:* Notes: Inference must be accurate with observation *Nota : Inferens mesti tepat dengan pemerhatian* P1: Drink less / plenty of salt water / salt concentration P2: The rate of urine production increases / decreases // Blood osmotic pressure is increasing / increasing **Note: Any 2 P** P1 : *Minum kurang /banyak air garam /kepekatan garam* P2 : *Kadar penghasilan air kencing bertambah / berkurang* *// Tekanan osmosis darah meningkat / bertambah* **Nota : Mana-mana 2 P** Sample answer : *Sampel jawapan :* 1. 1. Student P / low salt concentration, increased urine production rate// her blood osmosis pressure is reduced. *Murid P / kepekatan garam rendah, kadar penghasilan air kencing bertambah// tekanan osmosis darahnya berkurang.* 2. Student R / high salt concentration, lower urine production rate //increased blood osmotic pressure *Murid R / kepekatan garam tinggi , kadar penghasilan air kencing berkurang// tekanan osmosis darahnya bertambah*	3
	Able to make two inferences inaccurately based on **any one** aspect *Dapat menyatakan dua inferens secara kurang tepat berdasarkan salah satu kriteria di atas.* Sample answer : *Sampel jawapan :* 1. Student P drinks 2.0% salt, urine production rate increased // her blood osmosis pressure is reduced *Murid P minum 2.0% garam, kadar penghasilan air kencing bertambah// tekanan osmosis darahnya berkurang* 2. Students R drink a lot of salt. Urine volume is 85 ml. *Murid R minum banyak garam. Isipadu air kencing adalah 85 ml.*	2
	Able to make two inferences at idea level *Dapat menyatakan dua inferens pada peringkat idea* Sample answer / sampel jawapan: *Sampel jawapan :*	1

<table>
<tr><td></td><td>1. Excretion happen
Perkumuhan berlaku
2. Urine is produced
Air kencing dihasilkan.</td><td></td></tr>
<tr><td></td><td>No response or incorrect response</td><td>0</td></tr>
<tr><td></td><td><u>Scoring</u>
<table>
<tr><th>Score</th><th>Correct</th><th>Inaccurate</th><th>Idea</th><th>Wrong</th></tr>
<tr><td>3</td><td>2</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td rowspan="2">2</td><td>1</td><td>1</td><td>-</td><td>-</td></tr>
<tr><td>-</td><td>2</td><td>-</td><td>-</td></tr>
<tr><td rowspan="4">1</td><td>1</td><td>-</td><td>1</td><td>-</td></tr>
<tr><td>-</td><td>-</td><td>2</td><td>-</td></tr>
<tr><td>-</td><td>1</td><td>1</td><td>-</td></tr>
<tr><td>1</td><td>-</td><td>-</td><td>1</td></tr>
<tr><td rowspan="2">0</td><td>-</td><td>1</td><td>-</td><td>1</td></tr>
<tr><td>-</td><td>-</td><td>1</td><td>1</td></tr>
</table></td><td></td></tr>
</table>

<table>
<tr><th colspan="3">KB0610 - Controlling variables</th></tr>
<tr><td>1(c)</td><td>Able to state all 3 variables and the methods to handle the variable correctly
Sample answer:
Sampel jawapan:
<table>
<tr><th>Variable</th><th>Method to handle the variable</th></tr>
<tr><td>Manipulated variable:
PemDapat ubah dimanipulasi
Salt water concentration
Kepekatan air garam</td><td>use <u>different</u> salt water concentration/(from 2.0 % / 4.0 % /6.0 %) //
Menggunakan kepekatan air garam <u>berbeza-beza</u>// <u>berlainan</u> (dari 2.0 % / 4.0 % /6.0 %)</td></tr>
<tr><td>Responding variable:
PemDapat ubah bergerakbalas
Volume of urine produced between 2 hour//
Isipadu air kencing dalam tempoh 2 jam

Rate of urine produced
Kadar penghasilan air kencing</td><td>Measure and <u>record</u> the volume of urine produced by using a <u>measuring cylinder</u> //
Ukur dan <u>catat</u> isipadu air kencing yang dihasilkan menggunakan <u>silinder penyukat</u>

<u>Calculate</u> the rate of urine produced by <u>using formula</u>:

<u>Total Volume of urine (ml)</u>
Time (h)</td></tr>
</table></td><td></td></tr>
</table>

		Hitung kadar penghasilan air kencing menggunakan formula : <u>*Jumlah isipadu air kencing(ml)*</u> *Masa (jam)*	
	Constant variable *PemDapatubah tetap* students // *murid* volume of water // *isipadu air* time taken to collect the urine // *Masa diambil untuk mengambil air kencing* gender //age *jantina/ umur* temperature// *suhu*	**<u>Fix</u> (Tetapkan)** the same of students at each reading 1 and Reading 2 // *Murid yang sama untuk bacaan 1 dan bacaan* the volume of water which is 500 ml *Isipadu air iaitu 500 ml* the time taken 2 hours *masa yang diambil iaitu 2 jam* the gender /age which boy student *Jantina/umur murid* the room temperature *Suhu bilik 30˚C* only plain water *Air putih sahaja*	
	All 6 ticks		3
	Able to state 3 - 5 ticks		2
	Able to state 1 - 2 ticks		1
	No response or incorrect response		0

KB0611 - Making hypothesis		
1(d)	Able to make a hypothesis based on the following aspects: *Dapat menyatakan hipotesis dengan betul mengikut kriteria berikut :* P1: Manipulated variable: salt water concentration *kepekatan air garam* P2: Responding variable: (Volume of urine produced / rate of urine produced) *Jumlah) Isipadu air kencing //* *kadar penghasilan air kencing* P3: Relationship *Hubungan* Sample answer : *sampel jawapan:* 1. As the salt water concentration increases, the volume of urine produced / rate of urine produced decreased// vice versa. *Semakin bertambah kepekatan air garam , semakin berkurang (jumlah) isipadu air kencing // kadar penghasilan air kencing dan sebaliknya.*	3

	Able to make a hypothesis inaccurate *Dapat membuat hipotesis secara kurang tepat.* Sample answer : *sampel jawapan* 1. Different of salt water concentration have different volume of urine produced. *Kepekatan air garam yang berbeza, isipadu air kencing // kadar penghasilan air kencing juga berbeza.* 2. Volume of salt water concentration intake affects urine production. *Kepekatan air garam mempengaruhi isipadu air kencing // kadar penghasilan air kencing*	2
	Able to make a hypothesis correctly based on any one aspect / at idea level *Dapat membuat hipotesis pada peringkat idea* Sample answer: *sampel jawapan:* 1. the volume of urine // the volume of the absorbed water increases / decreases. *Isipadu air kencing // isipadu air yang diserap semula bertambah/berkurang.*	1

KB0606 – Communication		
1(e)(i)	Construct table/*Bina jadual* Able to construct a table and record all the data correctly based on the following aspects: *Dapat membina jadual dan merekod kesemua data dengan betul.* T: Titles with correct units - 1 mark D: Data recorded correctly - 1 mark C: Average volume of urine produced - 1 mark *T – Dapat menyatakan tajuk dengan unit yang betul – 1 m* *D – merekod semua data dengan betul – 1 m* *C – Purata isipadu kencing yang dihasilkan –1 m*	3

Sample answer :
Sampel jawapan

Student *Murid*	Salt water concentration (%) *Kepekatan air garam(%)*	Volume of urine produced, ml *Isipadu air kencing*, ml		Total volume of urine produced, ml *Jumlah isipadu air kencing dihasilkan,ml*	Rate of urine production (ml/h) *Kadar penghasilan air kencing* (ml/j)
		Reading 1 *Bacaan 1*	Reading 2 *Bacaan 2*		
P	2.0	88	79	167	83.5
Q	4.0	80	40	120	60.0
R	6.0	55	30	85	42.5

Able to state any two correct aspects	2
Able to state any one correct aspect	1
No response or incorrect response	0

KB0607 – Relationship between space and time

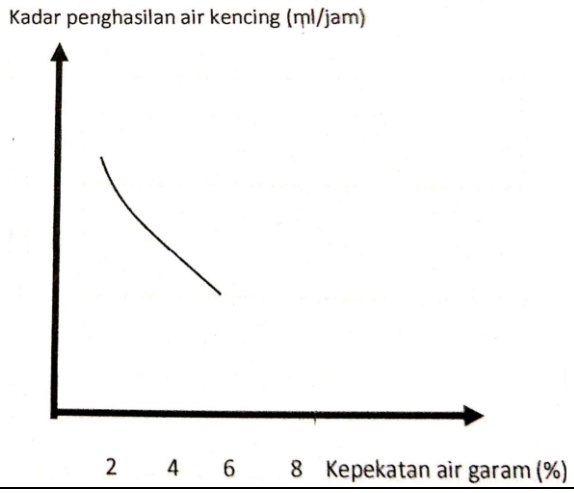
1(e)(ii) — 3

Graf

Able to draw graph with correctly to show the volume of urine produced by the students after drinking different salt of water concentration based on the following aspects:
Dapat melukis graf dengan betul untyuk menunjukkan isipadu air kencing yang dihasilkan dengan kepekatan air garam yang diminum selepas 2 jam berdasarkan aspek berikut :

Axes (P): Both axis with uniform scales - 1 mark
Points (T: All three point plotted - 1 mark
Shape (B): joining smooth all point (width one line) - 1 mark

Skala uniform pada kedua-dua paksi (1 m*)*
*Dapat memplot 3 titik dengan betul (*1 m*)*
*Dapat menghubungkan semua titik (*1 m*)*



	Any two aspects	2
	Any one aspect	1
	No response or incorrect response	0

KB0608 – Interpreting data		
1(f)	Able to state the relationship between salt water concentration and rate of urine produced based on: *Dapat menyatakan hubungan antara kepekatan air garam yang diminum dengan kadar penghasilan air kencing berdasarkan kepada:* R: Relationship (must **be correct** to get mark E1 and E2): R : *Hubungan (mesti betul untuk mendapatkan markah E1 dan E2)* The higher the salt water concentration intake, the lower the (average) volume of urine produced// vice versa *Semakin bertambah kepekatan (air) garam , semakin berkurang kadar penghasilan isipadu air kencing* E1 : Osmotic pressure increases *Tekanan osmosis darah semakin meningkat* E2 : More water reabsorbed (by the kidney) // more absorption of water increases/ urine produced is less / and concentrated *banyak air diperlukan oleh badan // penyerapan semula air meningkat/ Isipadu air kencing sedikit (dan pekat)* Sample answer : *Sampel jawapan:* The higher the salt concentration, the lower the volume of urine volume (R), as the blood osmotic pressure increases (E1) so more water is required for the body / volume of urine little (and concentrated) (E2). *Semakin bertambah kepekatan air garam, semakin berkurang kadar penghasilan isipadu air kencing (*R*), kerana tekanan osmosis darah makin meningkat (*E1*) maka banyak air diperlukan oleh badan / Isipadu air kencing sedikit (dan pekat) (*E2*).* **(1R + Any 2E)** **Note: If R1 wrong, reject E1 & E2** **R mesti betul untuk dapat markah E1 dan E. Jika R salah, secara automatik E1 dan E2 ditolak**	3

	Able to state the relationship based on R and any 1E // idea of R and any 2E Two aspects including **R1** Example: R1 + E1 / R1 + E2 Sample answer : S*ampel jawapan:* The production of urine by student R is higher than P and Q because osmotic pressure is higher and less water reabsorbed. *Penghasilan air kencing oleh murid R adalah tinggi dari P dan Q kerana kadar osmosis tinggi dan kurang air diserap.* Note: Relationship at idea level is not accepted. e.g: The production of urine influenced by taking of salt water concentration BUT Explanation can be accepted.	2
	Able to state an idea of the relationship and 1P // R only *Dapat menyatakan idea trentang hubungan dan 1*P/ R *sahaja* Sample answer : *Sampel jawapan:* The higher the salt water concentration intake, the lower the (average) volume of urine produced *Semakin tinggi kepekatan air garam, semakin rendah isipadu air kencing dihasilkan*	1
	No response or incorrect response	0

KB0609 – Defining by operation		
1(g)	Able to define operationally the rate of urine production based on the following aspects: *Dapat mendefinisi secara operasi 'penghasilan air kencing' berdasarkan aspek berikut:* D1: A process production of urine by Student P,Q and R *Suatu proses penghasilan air kencing oleh murid P,Q dan R* D2: shows that (Average) volume of urine produced after 2 hour *ditunjukkan oleh isipadu air kencing (selepas 2 jam)* D3: depends on intake of different salt water concentration *dipengaruhi oleh kepekatan air garam (yang berbeza-beza).*	3

	Sample answer : *Sampel jawapan:* Rate of urine production is a process by kidney of student and P,Q and R.(D1) It shows by volume of water produced in 2 hour(D2) depends on intake of different salt water concentration (D3). *Penghasilan air kencing adalah air yang dihasilkan oleh ginjal murid / lelaki (D1). Ia ditunjukkan oleh isipadu air kencing dalam 2 jam(D2). Ia dipengaruhi oleh kepekatan air garam yang berbeza-beza (D3).*	
	Able to define operationally based on any D aspects *Dapat mendefinisi mana-mana aspek 2 D*	2
	Able to define operationally based on any one aspect *Mana-mana 1 D betul*	1
	No response or incorrect response	0

KB0605 - Predicting		
1(h)	Able to predict the volume of urine produced based on the following aspects: *Dapat meramal isipadu air kencing dengan betul berdasarkan aspek berikut :* P: Prediction of volume (any number 167 ml / more than 167 ml) E1 : Distilled water has no salt (0 % NaCl) E2: Less ADH secreted/ // less water reabsorbed by the kidney// lots of urine produce liquid *P : Meramal jumlah isipadu air kencing lebih dari 167 ml* *E1 : air suling tiada garam / 0% Nacl* *E2: kurang ADH dirembeskan / kurang penyerapan semula air ke dalam kapilari darah// ispadu air kencing lebih banyak (dan cair).* Sample answer : *Sampel jawapan*: The total volume of urine is greater than 167 ml (P), because distilled water does not dissolve // 0% NaCl(E1), so less ADH is secreted / less absorption of water into the blood capillary // more urine volume (and liquid) (E2). *Jumlah Isipadu air kencing lebih dari 167 ml (P1), kerana air suling tiada garam larut // 0 % NaC l(E1) , maka kurang ADH dirembeskan / kurang penyerapan semula air ke dalam kapilari darah // isipadu air kencing lebih banyak (dan cair) (P3).* **Must Correct Prediction** **P + 2E's** *P1 mesti betul untuk dapat markah P2 dan P3. Jika P1 salah, secara automatik P2 dan P3 ditolak*	3

	Able to predict volume of urine produced based on R and any 1E	2
	Able to predict volume of urine produced correctly / R / idea of R and 1E	1
	No response or incorrect response	0
	No response or incorrect response	0

1(i)	**Clasify**	
	Able to classify the weather, the type of water and the state of the body with the state of urine produced. *Dapat mengelaskan cuaca, jenis air dan keadaan badan dengan keadaan air kencing yang dihasilkan* Sample answer : *Sampel jawapan*: 6 correctly 6 *betul*	3
	Able to state any 4- 5 correctly *Mana-mana 4-5 betul*	2
	Able to state 2-3 correctly *Mana-mana 2-3 betul*	1

Item *Item*	State of urine *Keadaan air kencing*	
	Less urine and concentrated *Air kencing sedikit dan pekat*	More urine and diluted *Air kencing banyak dan cair*
Weather *Cuaca*	Hot *Panas*	Cold *Sejuk*
Type of water *Jenis air*	Drinking sea water *Minum air laut*	Drinking river water *Minum air sungai*
Body condition *Keadaan badan*	Sweating *Berpeluh*	Relaxing *Berehat*

QUESTION 2
SOALAN 2

Problem statement: *Pernyataan masalah*	MV: Location // Rambutan orchard, Cabbage Farm and Chilies Farm RV: Squirrels population CV: Relation in question form and question symbol (?) 1. What is the relationship between the different location and the population of squirrel? *Apakah hubungan diantara lokasi berbeza dengan populasi tupai ?* 2. Does the Rambutans Gardens has the highest squirrels population compare to Cabbage Farms and Chilies Gardens ? *Adakah kebun Rambutan mempunyai populasi tupai yang paling banyak berbanding Kebun Kubis dan Kebun Cili ?*	3
Hypothesis:	MV : Location // Rambutan orchard, Cabbage Farms and Chilies Farms RV : Squirrels population H : Relation 1. Rambutan orchards has higher squirrels population compare to Cabbage Farms and Chilies Farm 2. Rambutan orchards has highest squirrels population	3
Variables: *PemDapat ubah:*	a) Manipulated variable: Location // Rambutan orchard, Cabbage Farms and Chilies farms *PemDapat ubah dimanipulasikan: Lokasi// Kebun Rambutan, Kebun Kubis dan Kebun Cili* b) Responding variable: Squirrels population *PemDapat ubah bergerak balas: Populasi tupai* c) Constant variables: The species of squirrels// the coverage// time interval for each capture *PemDapat ubah dimalarkan: Spesis tupai// Luas kawasan// masa untuk setiap tangkapan*	3
Material and apparatus	Dapat menyatakan 3 Bahan dan 4 Radas (7) Contoh jawapan: **Materials:** Squirrels, gloves ***Bahan:*** *Tupai,sarung tangan* **Apparatus:** Indian ink, threads, squirrels trap ,a pen, a note book ***Radas:*** *Dakwat india, benang perangkap tupai, pen,buku nota* 2A + 4A	3
	Dapat menyatakan 3-4 Bahan dan 1 Radas	2
	Dapat menyatakan 2 Bahan dan 1 Radas	1
	Dapat menyatakan 1 Bahan dan 1 Radas atau tiada respon atau respon yang salah	0

Procedure: *Prosedur:*	**Able to state K1, K2 ,K3,K4 and K5 correctly.** **K1 – Set up of apparatus - at least 3** **K2 – operating Fix Variable /Constant Variable** **K3 – operating responding variable** **K4 – operating Manipulated Variable** **K5 – precaution (langkah berjaga2)** **Procedure:** ***Prosedur:*** 1. Choose a Rambutan orchards to conduct the sampling. *Pilih Kebun rambutan untuk melakukan persampelan.* 2. Capture the squirrels as many as possible using the squirrels trap at dumping area 500 m (K1 dan K2). *Tangkap tupai seberapa banyak yang mungkin menggunakan perangkap tupai di kawasan lambakan* 500 *m (*K1 *dan* K2*)* 3. Count and record the number of the squirrels in the first captures as P (K3). *Kira dan rekodkan jumlah tupai dalam tangkapan pertama sebagai P (*K3*)* 4. Mark all the captures squirrels by using an Indian ink/ thread at their feet (K1 and K5). *Tandakan semua tupai dengan menggunakan dakwat India / benang di kaki mereka* (K1 *dan* K5). 5. Released all the squirrels at the same area of their habitat. (K1) *Lepaskan semua tupai di kawasan habitat yang sama.* (K1) 6. Allow 5 to 7 days for the squirrels to mix with other rats in their population. (K1 and K2). *Biarkan 5 hingga 7 hari untuk tupai bercampur dengan tikus lain dalam populasi mereka*. (K1 *dan* K2) 7. Recapture the squirrels as many as possible in the area which they were released. *Tangkap semula tupai sebanyak mungkin di kawasan yang dibebaskan* 8. Counted and recorded the number of squirrels captured in the second captures as Q.(K3) *Hitung dan catat bilangan tupai yang dalam tangkapan kedua sebagai* Q.(K3) 9. Counted and recorded the number of squirrels which are marked from the second captured as R.(K3) *Hitung dan catat bilangan tupai yang bertanda dari tangkapan kedua sebagai* R.(K3) 10. Determine the population of the squirrel by using formula: Populasi size = $\frac{P \times Q}{R}$ (K3)	3

Tentukan populasi tupai menggunakan formula berikut:

$$\textit{Saiz populasi} = \frac{P \times Q}{R} \quad \text{(K3)}$$

11. Repeat the experiment at the Cabbage Farms and Chilies farm. Record all data in a table. (K4)
    Ulang eksperimen di Kebun Kubis dan Kebun Cili.Rekod semua data dalam jadual .(K4)
12. Repeat experiment 2 times for getting average reading of squirrel's population. (K5)
    Ulang eksperimen sebanyak 2 kali untuk mendapat purata bacaan populasi tupai.(K5)

Presentation of data:
Persembahan data:

Location/ Area *Lokasi/Kawasan*	Number of squirrels from first capture, P *Bilangan tupai dari tangkapan pertama,* P	Number of squirrels from second capture *Bilangan tupai dari tangkapan kedua*		Squirrels population size *Saiz Populasi tupai*
		Number of squirrels from second capture ,Q *Bilangan tupai dari tangkapan kedua,*Q	Marked ,R *Bertanda* ,R	
Rambutan orchard *Kebun rambutan*				
Cabbage Garden *Kebun kubis*				
Chilies orchard *Kebun cili*				

2

END OF MARKING SHEME
PERATURAN PEMARKAHAN TAMAT