

Answer **all** questions.

Jawab **semua** soalan

1.

Osmoregulation is the process of regulating salt and water balance in the body fluid to maintain the blood osmotic pressure.

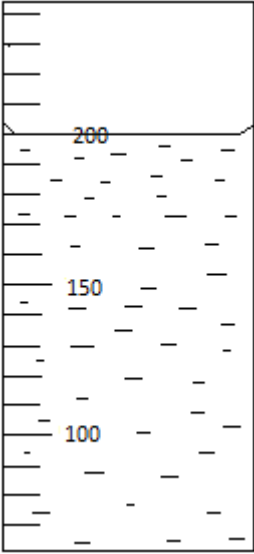
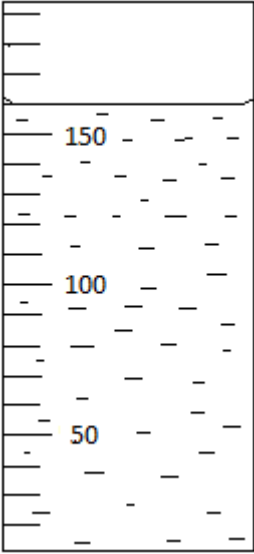
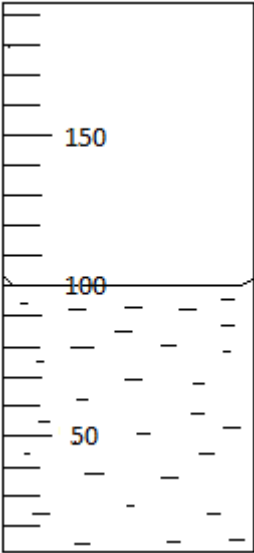
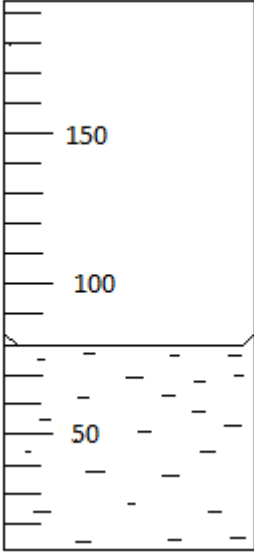
Pengosmokawalaturan merupakan proses mengawalatur keseimbangan garam dan air dalam bendalir badan untuk mengekalkan tekanan osmosis darah.

A group of students carried out an investigation to study the effects of different temperature on the production of urine. Three students were placed in three different rooms which has different temperature that is 17°C, 25°C and 30°C. The volume of urine produced after 60 minutes by each student was collected and measured. Each student need to drink 500 ml of mineral water at the beginning of the experiment. The experiment was repeated two times.

Sekumpulan pelajar telah menjalankan suatu penyiasatan tentang kesan suhu yang berbeza ke atas penghasilan air kencing . Tiga orang pelajar telah diletakkan di dalam tiga bilik yang mempunyai suhu yang berbeza iaitu 17°C, 25°C dan 30°C. Isipadu air kencing yang dihasilkan selepas 60 minit telah dikumpulkan dan diukur bagi setiap pelajar. Setiap pelajar dikehendaki meminum 500 ml air mineral di awal eksperimen. Eksperimen telah diulang sebanyak dua kali .

Table 1 shows the results of this experiment.

Jadual 1 menunjukkan keputusan eksperimen ini.

Student <i>Pelajar</i>	Temperature of room (°C) <i>Suhu bilik</i> (°C)	Volume of urine produced (ml) <i>Isipadu air kencing yang dihasilkan (ml)</i>		Average volume of urine (ml) <i>Purata</i> <i>isipadu air</i> <i>kencing</i> (ml)
		First reading <i>Bacaan pertama</i>	Second reading <i>Bacaan kedua</i>	
A	17	 	 	
		 	 	

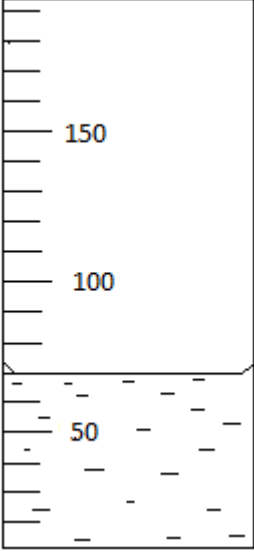
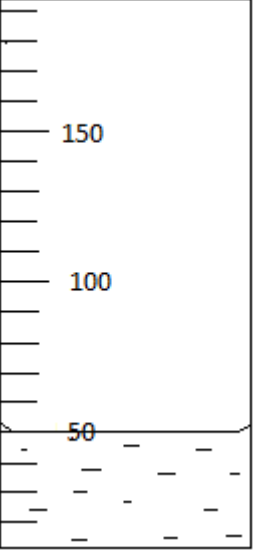
C	30	 	 	
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Table 1 / Jadual 1

- (a) Record the volume of urine that have been collected in the measuring cylinder in the space provided in Table 1.

Rekod isipadu air kencing yang dikumpulkan di dalam silinder penyukat di ruang yang disediakan dalam Jadual 1.

[3 marks / markah]

- (b)(i) Based on Table 1, state **two** different observations.

*Berdasarkan Jadual 1, nyatakan **dua** pemerhatian yang berbeza*

Observation 1/ *Pemerhatian 1 :*

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Observation 2/ *Pemerhatian 2 :*

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[3 marks / 3 markah]

- (ii) State **two** inferences which correspond to the observations in 1(b)(i).

*Nyatakan **dua** inferens yang sepadan dengan pemerhatian di 1(b)(i).*

Inference from observation 1/*Inferens daripada pemerhatian 1:*

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Inference from observation 2 /*Inferens daripada pemerhatian 2:*

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[3 marks / 3 markah]

- (c) Complete Table 2 based on this experiment.

Lengkapkan Jadual 2 berdasarkan eksperimen ini.

Variable <i>Pemboleh ubah</i>	Method to handle the variable <i>Kaedah mengendali pembolehubah</i>
Manipulated variable <i>Pemboleh ubah dimanipulasikan</i>	
Responding variable <i>Pemboleh ubah bergerak balas</i>	
Constant variable <i>Pemboleh ubah dimalarkan</i>	

Table 2 / Jadual 2

[3 marks / 3 markah]

- (d) State the hypothesis for this experiment.

Nyatakan hipotesis bagi eksperimen ini.

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[3 marks / 3 markah]

- (e)(i) Construct a table and record all the data collected from this experiment.

Your table should have the following titles:

Bina satu jadual dan rekodkan semua data yang dikumpul daripada eksperimen ini.

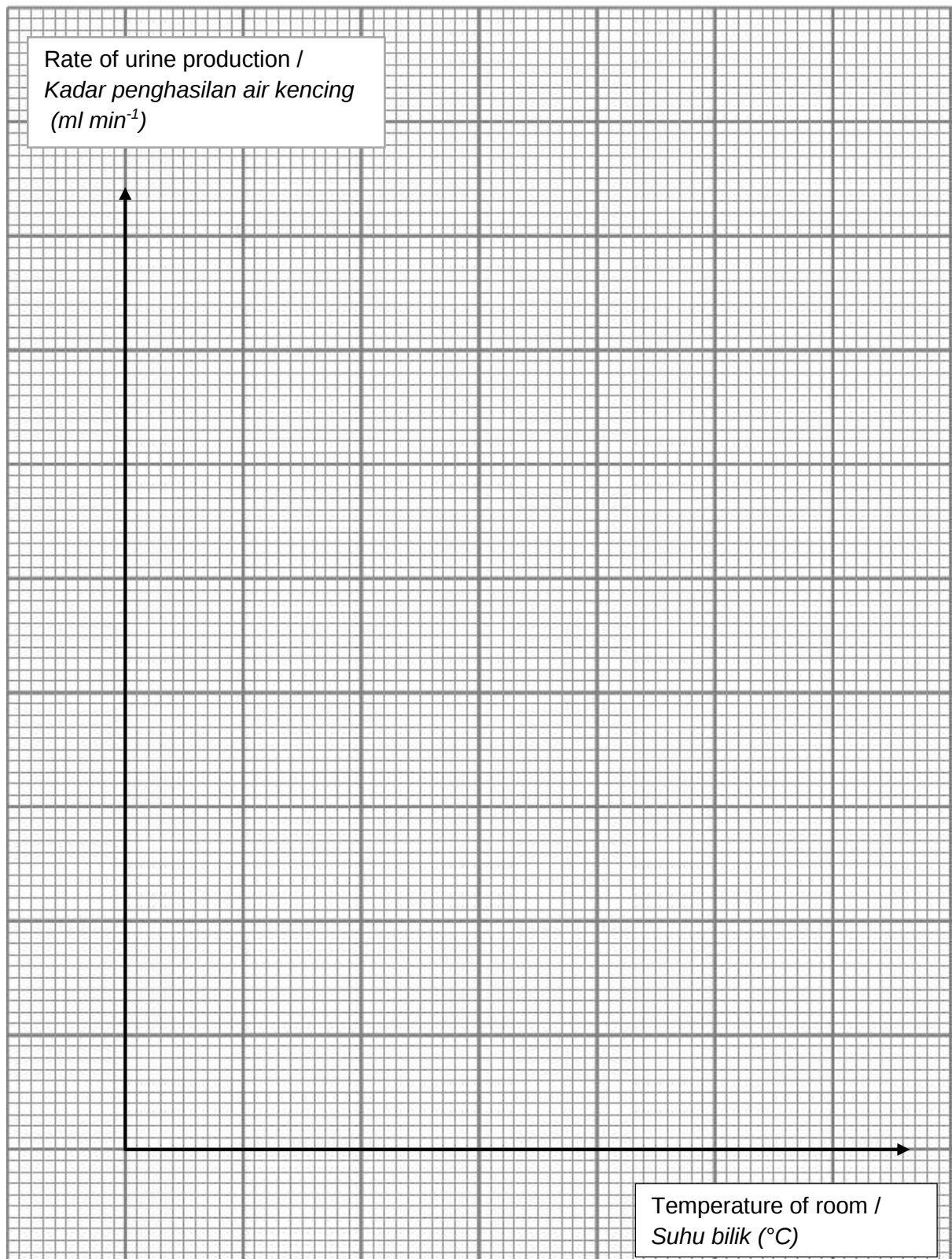
Jadual anda hendaklah mengandungi tajuk-tajuk berikut :

- Student / Pelajar
- Temperature of room / Suhu bilik
- Volume of urine / Isipadu air kencing
- Average volume of urine / Purata isipadu air kencing
- Rate of urine production / Kadar penghasilan air kencing

[3 marks / 3 markah]

Rate of urine production against temperature of room.

Kadar penghasilan air kencing melawan suhu bilik.



- (ii) Use the graph paper provided on page 7 to answer this question.

By using the data in 1(e)(i), draw a graph of rate of urine production against temperature of room.

Guna kertas graf yang disediakan di halaman 7 untuk menjawab soalan ini.

Dengan menggunakan data di 1(e)(i), lukis graf bagi kadar penghasilan air kencing melawan suhu bilik.

[3 marks / markah]

- (f) Based on the graph in 1(e)(ii), state the relationship between the temperature of room and the rate of urine produced.

Explain your answer.

Berdasarkan graf di 1(e)(ii), nyatakan hubungan antara suhu bilik dengan kadar penghasilan air kencing .

Terangkan jawapan anda.

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[3 marks / 3 markah]

- (g) Based on the result of this experiment, state the operational definition of osmoregulation.

Berdasarkan keputusan eksperimen ini, nyatakan definisi secara operasi bagi pengosmokawalaturan.

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[3 marks / 3 markah]

- (h) The air conditioner in the room where student B is placed is not functioning. This causes an increase in the temperature of the room and become hotter. Predict the average volume of the urine produced by student B after 60 minutes.

Penyaman udara di bilik yang menempatkan pelajar B tidak berfungsi. Ini menyebabkan suhu bilik tersebut meningkat dan menjadi semakin panas. Ramalkan purata isipadu air kencing yang dihasilkan oleh pelajar B selepas 60 minit.

Explain your answer.

Terangkan ramalan anda .

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[3 marks / 3 markah]

- (i) The lists below are the material and apparatus that have been used in the experiment. Classify the material and apparatus based on their group in Table 3.

Senarai di bawah adalah bahan dan radas yang digunakan dalam eksperimen ini. Kelaskan bahan dan radas berikut mengikut kumpulan yang sesuai di dalam Jadual 3.

- Paper cup / Cawan kertas
- Student / Pelajar
- Mineral water / Air mineral
- Measuring cylinder / Silinder penyukat
- Air conditioner / Penyaman udara

Material Bahan	Apparatus Radas

Table 3/ Jadual 3

[3 marks / 3 markah]

2. Encik Harith has been appointed as a dietitian at the Bandar A Sports Institute. His first assignment was to plan a breakfast menu that athletes would take in before starting their daily workout routine.

Table 1 refers to the energy requirements given to Encik Harith as a guide.

Encik Harith telah dilantik menjadi pakar pemakanan di Institut Sukan Bandar A. Tugasan pertama beliau ialah merancang satu menu sarapan yang akan diambil oleh atlit-atlit sebelum memulakan rutin latihan harian mereka.

Jadual 1 merujuk kepada keperluan tenaga yang diberi kepada Encik Harith sebagai panduan.

Table 1/Jadual 1

Carbohydrate requirements / Keperluan Karbohidrat		
Age range / Peringkat umur	Carbohydrate requirements in daily diet / Keperluan karbohidrat dalam diet harian	Calories / Kalori (kJ)
Boys / <i>Kanak-kanak lelaki</i>	50-60%	1400-1750
Girls / <i>Kanak-kanak perempuan</i>	50-60%	1100-1300
Adults / <i>Dewasa</i>	50-60%	1300
Athletes in training / <i>Atlit dalam latihan</i>	60-70%	1800
High endurance athletes / <i>Atlit berdaya tahan tinggi</i>	60-70%	2450

Based on Table 1, Mr. Harith found that athletes in training require a rather high amount of energy before undergoing daily training. The following is a menu that has been designed by him:

Berdasarkan Jadual 1, Encik Harith mendapati bahawa atlit dalam latihan memerlukan tenaga yang agak tinggi sebelum menjalani latihan harian. Berikut merupakan menu yang telah dirancang oleh beliau:

Menu/Menu	Quantity / Kuantiti
Bread X / Roti X	2 slices / 2 keping
Half boiled egg / Telur separuh masak	1 / 1 biji
Banana / Pisang	2 / 2 biji
Fresh milk / Susu segar	A glass / 1 gelas

Mr Harith found that there were three types of bread prepared by the institute which are white bread, high fiber bread and butterscotch butter bread.

Encik Harith mendapati bahawa terdapat tiga jenis roti yang disediakan oleh institut tersebut iaitu roti putih, roti berserat tinggi dan roti mentega butterscotch.

Plan a laboratory experiment to determine the energy value of the three types of bread above to help Mr. Harith chooses the most suitable type of bread to use in the menu.

Rancang satu eksperimen makmal untuk menentukan nilai tenaga bagi tiga roti di atas untuk membantu Encik Harith membuat pilihan jenis roti yang paling sesuai digunakan dalam menu tersebut.

Your experimental plan should include:

Perancangan eksperimen anda hendaklah mengandungi :

- Problem statement / Pernyataan masalah
- Hypothesis / Hipotesis
- Variables / Pembolehubah
- List of apparatus and material / Senarai radas dan bahan
- Experimental procedure / Prosedur eksperimen
- Presentation of data / Persembahan data

[17 marks / markah]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT