

SULIT  
4551/3  
Biologi  
Kertas 2  
September

Nama

Tingkatan

1 ½ jam



JABATAN PELAJARAN MELAKA



Dengan Kerjasama

PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA  
SEKOLAH MENENGAH MALAYSIA (PKPSM)  
CAWANGAN MELAKA

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PEPERIKSAAN PERCUBAAN  
SIJIL PELAJARAN MALAYSIA 2007

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BIOLOGI

Kertas 3

Satu jam tiga puluh minit

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JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Tulis nombor nama dan tingkatan anda pada ruangan yang disediakan.
2. Kertas soalan ini adalah dwibahasa.
3. Soalan di halaman kiri adalah dalam bahasa Inggeris. Soalan di halaman kanan adalah yang sepadan dalam bahasa Melayu.
4. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan dalam bahasa Inggeris atau bahasa Melayu.
5. Calon dikehendaki membaca maklumat di halaman 2 atau halaman 3.

| Untuk kegunaan pemeriksa |              |                   |
|--------------------------|--------------|-------------------|
| Soalan                   | Markah Penuh | Markah Diperolehi |
| 1                        |              |                   |
| 2                        |              |                   |
| Jumlah                   |              |                   |

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Kertas soalan ini mengandungi 19 halaman bercetak termasuk kulit

**INFORMATION FOR CANDIDATES**

1. *This question paper consists of two question. Answer **all** questions..*
2. *Writer your answers for **Question 1** in the spaces provided in the question paper.*
3. *Write your answers for **Question 2** on the "helaian tambahan" provided by the invigilators. You may uses equations, diagrams, tables, graphs and other suitable methods to explain your answer.*
4. *Show your working, it may help you to get marks.*
5. *If you wish to change your answer, neatly cross out the answer that you have done. Then write down the new answer.*
6. *The diagrams in the question are not drawn to scale unless stated.*
7. *Marks allocated for each question or part question are shown in brackets.*
8. *The time suggested to answer **Questions 1** is 45 minuts and **Question 2** is 45 minutes.*
9. *You may use a non-programmable scientific calculator.*
10. *Hand in all your answer sheets at the end of the examination.*

Marks awarded:

| <b>Score</b> | <b>Description</b>                       |
|--------------|------------------------------------------|
| <b>3</b>     | <b>Excellent:</b> The best response.     |
| <b>2</b>     | <b>Satisfactory:</b> An average response |
| <b>1</b>     | <b>Weak:</b> An inaccurate response      |
| <b>0</b>     | No response <u>or</u> wrong response.    |

Answer **all** questions.

1. A group of students carried out an experiment to study the effect of different concentrations of drinking water on the volume of urine.

The night before the experiment, three students were not allowed to drink any water and nor eat any food after 11.00 pm. On the morning of the experiment at 7.30 am, each student ate a piece of bread and drank 500 ml mineral water. These students were not allowed to take any drink for an hour. At 8.30 am a urine samples are collected from each student. The urine samples were measured and used as controls.

Table 1.1 shows the volume of urine collected from each student.

| Student         | A | B | C |
|-----------------|---|---|---|
| Urine collected |   |   |   |

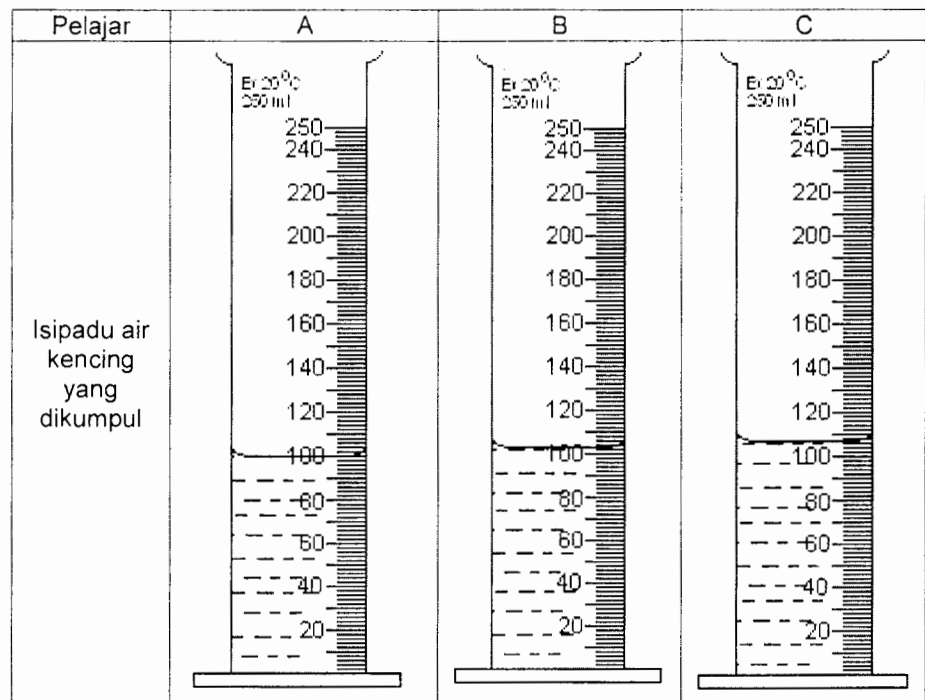
TABLE 1.1

Jawab semua soalan.

1. Sekumpulan pelajar telah menjalankan satu eksperimen untuk mengkaji kesan pengambilan minuman yang berbeza kepekatan garam dengan isipadu penghasilan air kencing.

Pada malam sebelum eksperimen dijalankan, tiga pelajar tidak dibenarkan makan atau minum selepas jam 11.00 malam. Pada pagi kajian dijalankan iaitu pada pukul 7.30 pagi, setiap pelajar hanya diberi makan sebuku roti dan sebanyak 500 ml air mineral untuk diminum. Pelajar ini tidak dibenar mengambil sebarang minuman dalam tempoh satu jam. Pada pukul 8.30 pagi, air kencing yang dihasilkan oleh setiap pelajar dikumpulkan. Air kencing yang terkumpul disukat menggunakan selinder penyukat dan dijadikan sebagai radas kawalan.

Jadual 1.1 menunjukkan isipadu air kencing yang dikumpulkan oleh setiap pelajar.



JADUAL 1.1

At 8.30 am, the students were given three different types of drinking water which they drank as quickly as possible as shown in Table 1.2 below.

| Student | Type of drinking water                    |
|---------|-------------------------------------------|
| A       | 500 ml mineral water                      |
| B       | 500 ml of 2.5 % sodium chloride solution. |
| C       | 500 ml of 5.0 % sodium chloride solution. |

TABLE 1.2

Urine samples of each student were taken after an hour is shown in Table 1.3

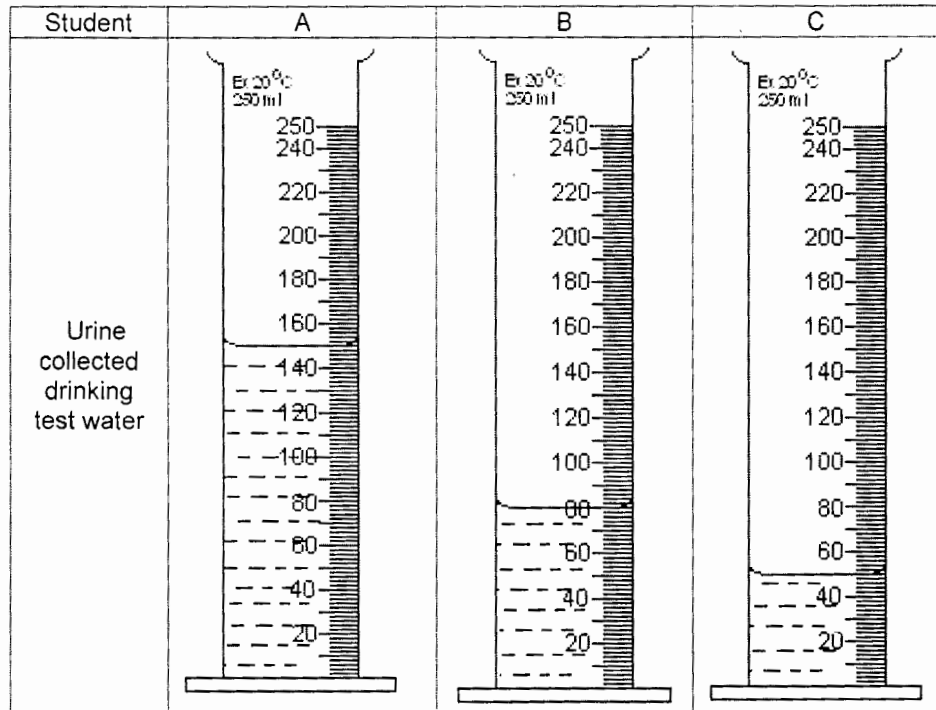


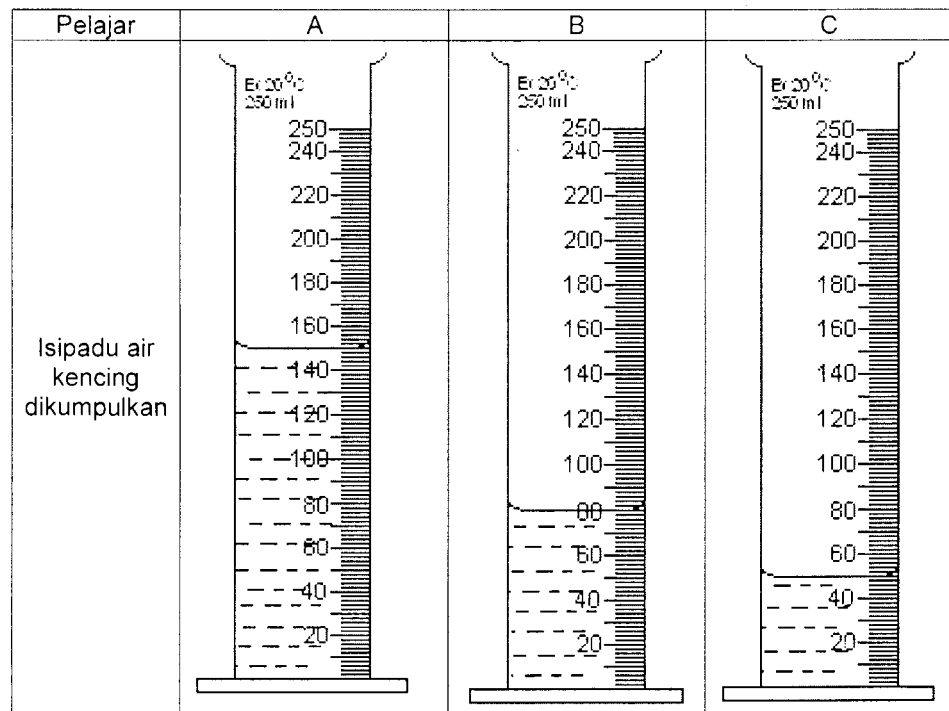
TABLE 1.3

Pada pukul 8.30 pagi, setiap pelajar di beri minum air minuman seperti Jadual 1.2 di bawah.

| Subjet    | Jenis air minuman                     |
|-----------|---------------------------------------|
| Pelajar A | 500 ml air mineral                    |
| Pelajar B | 500 ml larutan 2.5 % Natrium klorida. |
| Pelajar C | 500 ml larutan 5.0 % Natrium klorida. |

JADUAL 1.2

Air kencing yang dihasilkan selepas satu jam dikumpulkan daripada setiap pelajar menggunakan selinder penyukat dan hasilnya ditunjukkan dalam Jadual 1.3 di bawah.



JADUAL 1.3

For  
Examiner's  
use

1(a)(i)

1(a)(ii)

1(b)

(a) (i) Based on Table 1.3 state **two** observations on the relationship between the type of drinking water and the volume of urine collection.

1. ....

.....

2. ....

.....

[3 marks]

(ii) State the inference which corresponds to the observations in 1 (a)(i)

1. ....

.....

2. ....

.....

[3 marks]

(b) Complete the Table 1.4 by recording the volume of urine collection after drinking test water.

| Type of Test Water             | Volume of urine collection (ml). |
|--------------------------------|----------------------------------|
| 0 % sodium chloride solution   |                                  |
| 2.5 % sodium chloride solution |                                  |
| 5.0 % sodium chloride solution |                                  |

TABLE 1.4

[3 marks]

(a) (i) Berdasarkan Jadual 1 (c), nyatakan dua pemerhatian tentang hubungan antara jenis air minuman dan isipadu air kencing yang dihasilkan.

1. ....
2. ....

[3 markah]

Untuk  
Kegunaan  
Pemeriksa

1(a)(i)

(ii) Nyatakan inferens yang sepadan dengan pemerhatian di 1 (a) (i)

1. ....
2. ....

[3 markah]

1(a)(ii)

(b) Lengkapkan Jadual 1.4 dengan merekod isipadu air kencing dari dalam jadual 1.3 yang dihasilkan oleh setiap pelajar selepas minum air ujikaji.

| Jenis Minuman                 | Isipadu Air Kencing yang dikumpul (ml) |
|-------------------------------|----------------------------------------|
| 0 % Larutan Natrium Klorida   |                                        |
| 2.5 % Larutan Natrium Klorida |                                        |
| 5.0 % Larutan Natrium Klorida |                                        |

JADUAL 1.4

[3 markah]

1(b)



For  
Examiner's  
use

(c) (i) Complete the Table 1.5 base on the experiment that was carried out.

| Variables                                              | Method to handle the variable |
|--------------------------------------------------------|-------------------------------|
| <b>Manipulated variable</b><br>.....<br>.....<br>..... | .....<br>.....<br>.....       |
| <b>Responding variable</b><br>.....<br>.....<br>.....  | .....<br>.....<br>.....       |
| <b>Controlled variable</b><br>.....<br>.....<br>.....  | .....<br>.....<br>.....       |

1(c)(i)

TABLE 1.5

[3 marks]

(c) (i) Lengkapkan Jadual 1.5 berdasdarkan eksperimen ini.

Untuk  
Kegunaan  
Pemerksa

| Pembolehubah                                            | Cara mengendali pembolehubah |
|---------------------------------------------------------|------------------------------|
| Pembolehubah dimanipulasikan<br>.....<br>.....<br>..... | .....<br>.....<br>.....      |
| Pembolehubah bergerakbalas<br>.....<br>.....<br>.....   | .....<br>.....<br>.....      |
| Pembolehubah dimalarkan<br>.....<br>.....<br>.....      | .....<br>.....<br>.....      |

JADUAL 1.3

[3 markah]

1(c)(i)

For  
Examiners  
use

(ii) The following list is part of the apparatus and material used in this experiment.

Stopwatch, Sodium chloride solution, Beaker, Volume measurement,  
Mineral water, Urine

Complete Table 1.6 by matching each variable with the apparatus and material used in this experiment.

| Variable    | Apparatus | Material |
|-------------|-----------|----------|
| Manipulated |           |          |
| Responding  |           |          |
| Controlled  |           |          |

TABLE 1.6

[3 marks]

1(c)(ii)

(d) State the hypothesis for this experiment.

.....

.....

.....

[3 marks]

1(d)

(e) (i) Base on the Table 1.3, construct the table and record the results of this experiment which includes the following aspects:

- Percentage of sodium chloride solution.
- Volume of urine collected
- Water reabsorbed in kidney.

[3 marks]

1(e)(i)

- (ii) Senarai berikut adalah sebahagian daripada radas dan bahan yang digunakan dalam eksperimen ini.

Jam randik, Larutan Natrium Klorida, Bikar, Selinder Penyukat,  
Air Mineral, Air Kencing

Lengkapkan Jadual 1.6 dengan memadamkan setiap pembolehubah dengan radas dan bahan yang digunakan dalam eksperimen ini.

| Pembolehubah  | Radas | Bahan |
|---------------|-------|-------|
| Dimanipulasi  | ..... | ..... |
| Bergerakbalas | ..... | ..... |
| Dimalarkan    | ..... | ..... |

JADUAL 1.6

[3 markah]

- (d) Nyatakan hipotesis bagi eksperimen ini.

.....

.....

.....

[3 markah]

- (e) (i) Berdasarkan Jadual 1.3, bina satu jadual dan rekodkan keputusan eksperimen yang meliputi aspek-aspek berikut.

- Peratus Kandungan Natrium Klorida.
- Isipadu air kencing
- Serapan air oleh ginjal.

[3 markah]

Untuk  
Kegunaan  
Pemeriksa

1(c)(ii)

1(d)

1(e)(i)

For  
Examiner's  
use

1(e)(ii)

1(e)(iii)

1(f)

1(g)

(ii) On the graph paper, draw the graph of water reabsorbed by kidneys against the percentage of sodium chloride solution in drinking water test. [3 marks]

(iii) Explain the relationship between the water reabsorbed and percentage of sodium chloride solution in drinking water test based on the graph in 1(e)(ii).  
.....  
.....  
.....  
[3 marks]

(f) Based on this experiment, what can you deduce about osmoregulation?  
.....  
.....  
.....  
[3 marks]

(g) In another experiment, student B drank 2.5 % cooled sodium chloride. Predict the observation for volume of urine collection for an hour and explain the results of the experiment.  
.....  
.....  
.....  
[3 marks]

(ii) Pada kertas graf yang disediakan di halaman bergraf, lukiskan kadar penyerapan air oleh ginjal melawan kepekatan garam Natrium Klorida dalam air minuman.

[3 markah]

1(e)(ii)

(iii) Berdasarkan graf yang diperolehi, terangkan hubungan antara kadar penyerapan air oleh ginjal dan garam Natrium Klorida dalam air minuman.

.....  
.....  
.....

[3 markah]

1(e)(iii)

(f) Berdasarkan eksperimen ini, apakah yang dapat anda rumuskan tentang pengosmokawalaturan.

.....  
.....  
.....

[3 markah]

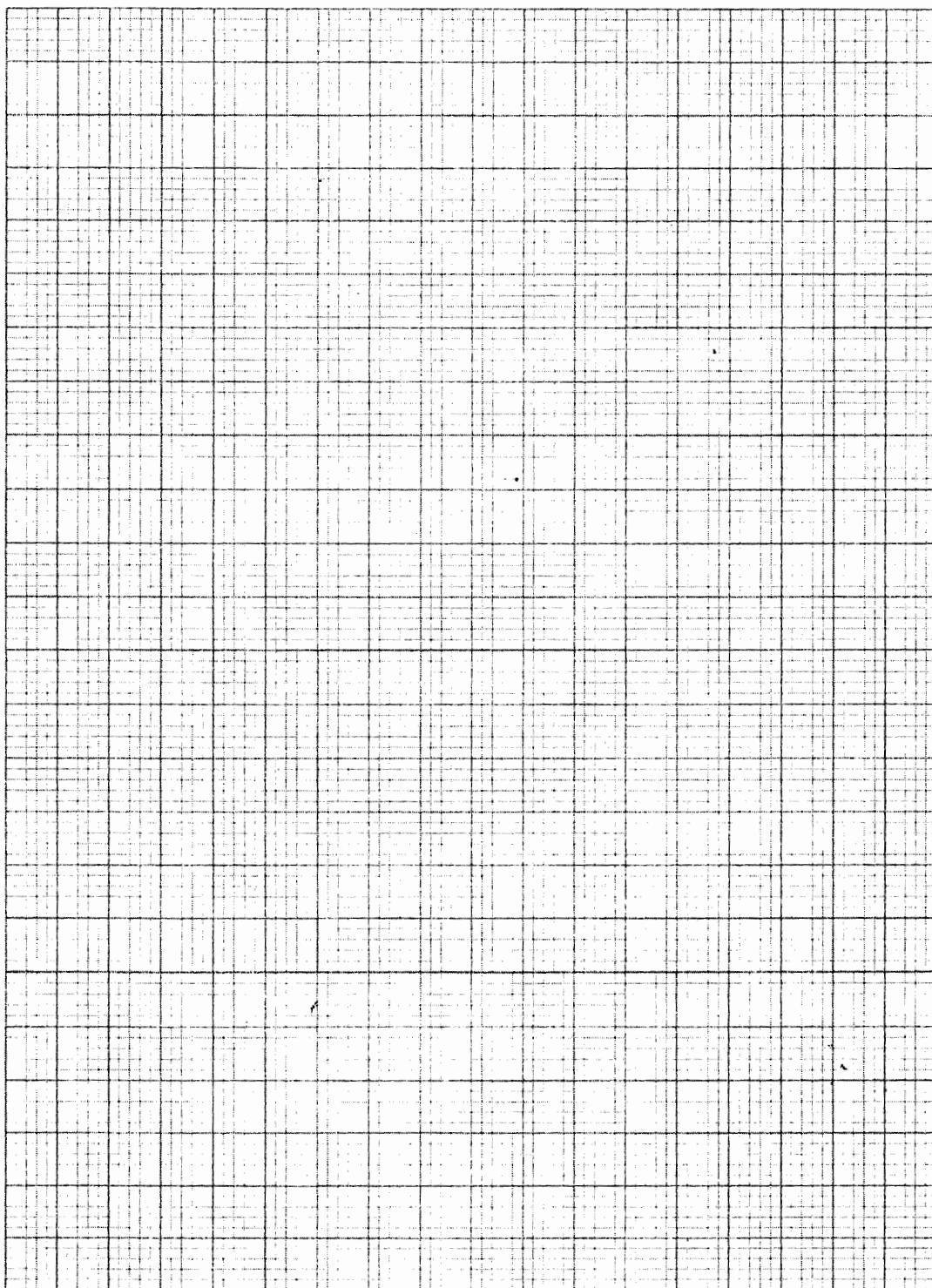
1(f)

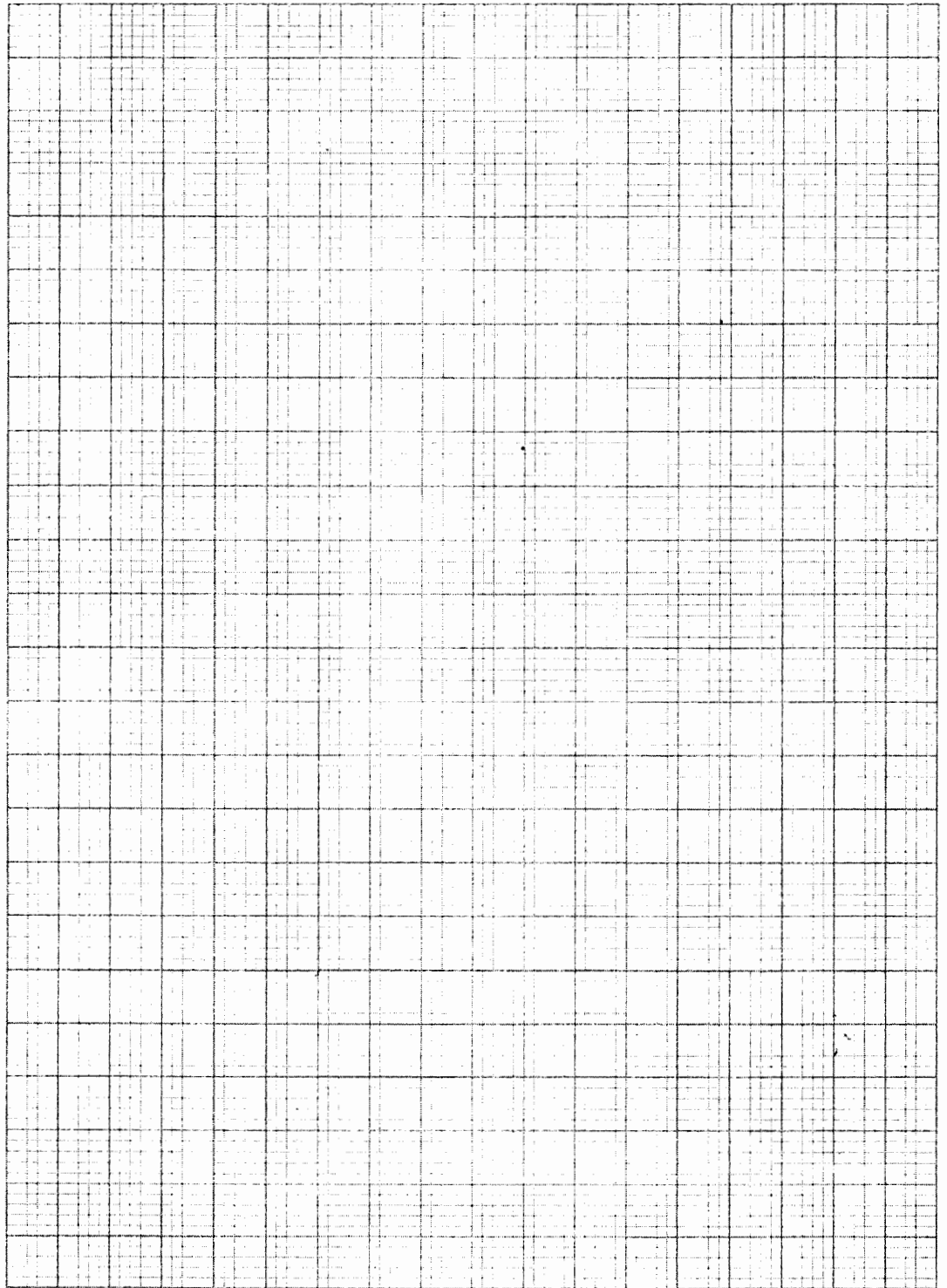
(g) Eksperimen yang lain diulang dengan memberikan Pelajar 2 meminum 2.5 % Natrium Klorida berair. Ramalkan penghasilan air kencing pelajar tersebut dalam tempoh satu jam dan terangkan kenapa kandungan air kencingnya seperti yang anda nyatakan.

.....  
.....  
.....

[3 markah]

1(g)







2. The Department of Environment (DOE) has received numerous complaints from residents about water pollution in rivers all over Malaysia. The main cause of water pollution in many rivers is due to the discharge of domestic waste into the river. This in turn will affect reservoirs especially in Klang Valley.

Based on the report, you as a representative from DOE are required to plan a laboratory experiment to study the level of water pollution at different sources of polluted river as reported.

The planning of your experiment must include the following aspects:

- Statement of identified problem
- Objective of study
- Variables
- Statement of hypothesis
- List of materials and apparatus
- Technique used
- Experimental procedure
- Presentation of data
- Conclusion

[17 marks]

**END OF QUESTION PAPER**

2. Jabatan Alam Sekitar sering menerima aduan daripada penduduk setempat mengenai pencemaran sungai-sungai di Malaysia. Punca utama pencemaran yang berlaku di kebanyakan sungai ini adalah disebabkan pembuangan bahan kumbahan domestik ke dalam air. Keadaan ini menyebabkan pencemaran berlaku kepada kawasan air tadahan terutamanya di sekitar Lembah Kelang.

Berdasarkan laporan tersebut, anda sebagai wakil kepada Jabatan Alam Sekitar dikehendaki merancang satu eksperimen makmal untuk mengkaji tahap pencemaran air sungai dari beberapa buah sungai yang telah dilaporkan tercemar.

Perancangan eksperimen hendaklah meliputi aspek-aspek berikut:

- Penyataan Masalah
- Objektif kajian
- Hipotesis
- Pembolehubah
- Senarai alat radas dan bahan
- Teknik yang digunakan
- Kaedah atau prosedur eksperimen
- Cara data dikomunikasikan
- Kesimpulan

**KERTAS SOALAN TAMAT**