Name: _____ ( ) 4551/3

Class: _____

BIOLOGY Paper 3

9th Sept 2014

$1\frac{1}{2}$ hours

SMJK PEREMPUAN CHINA PULAU PINANG
TRIAL EXAMINATION 2014
FORM 5 BIOLOGY
PAPER 3
Time: 1 hour 30 minutes

DO NOT OPEN THIS QUESTION PAPER UNTIL INSTRUCTED

INFORMATION FOR CANDIDATES:

1. This question paper consists of two questions: **Question 1** and **Question 2**. Answer all questions.

2. You are advised to spend 45 minutes to answer **Question 1** and 45 minutes for **Question 2**.

For examiner's use		
Question	Marks	Marks obtained
1	33	
2	17	
Total	50	

This question paper consists of 8 printed pages.

Answer **ALL** questions.

1. An experiment was carried out to study the extent of water pollution in four different rivers in Penang. Four water samples, P, Q, R and S, one from each river, were collected.

   Diagram 1 shows the method used for water sample P. The time taken for the methylene blue solution to decolourise is shown in Diagram 2.

   The procedure was repeated for the rest of the water samples.

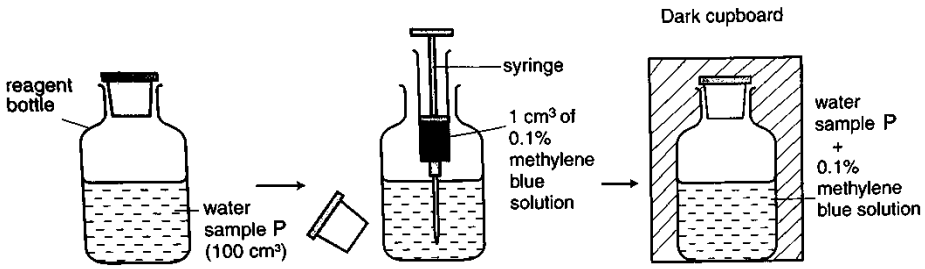


Diagram 1

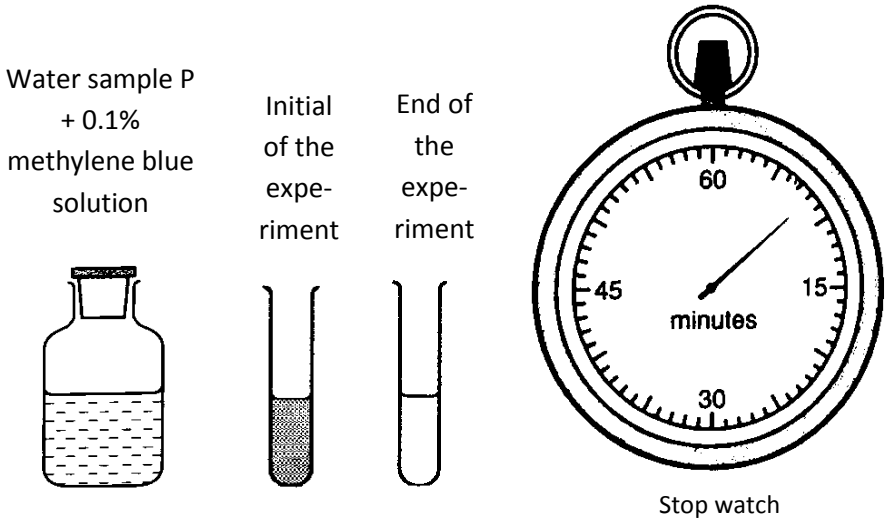
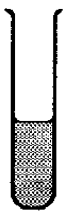
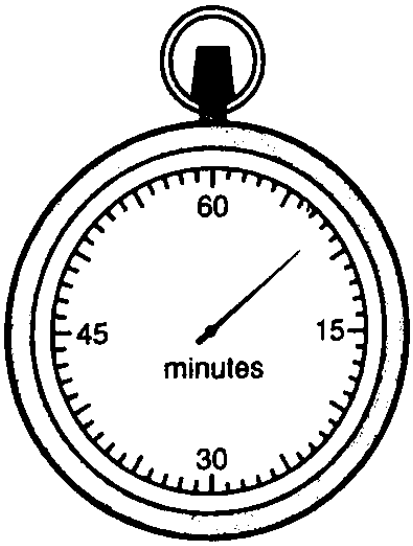
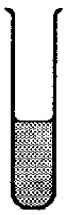
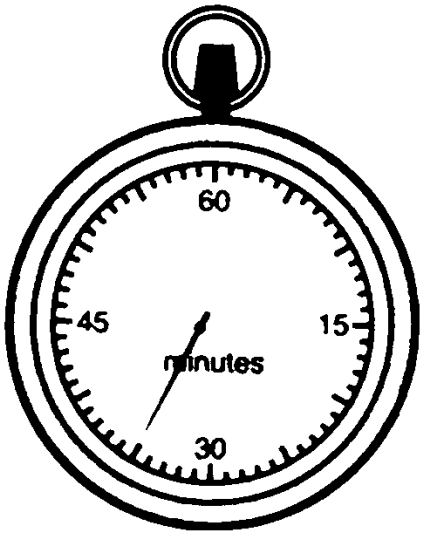


Diagram 2

Water Sample	Observations		Reading on a stopwatch for the methylene blue solution to turn decolourised	Time taken (minute)
	Initial	End		
P				
Q				

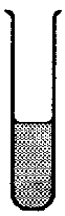
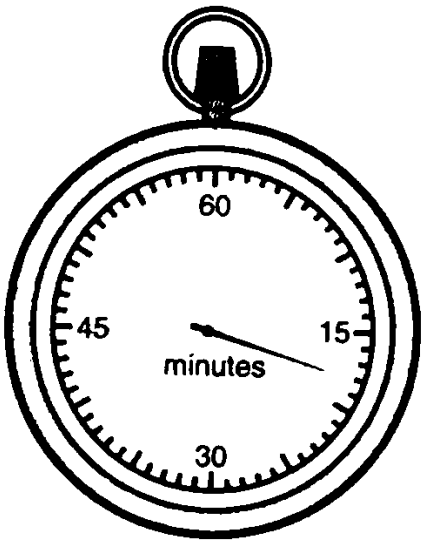
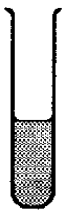
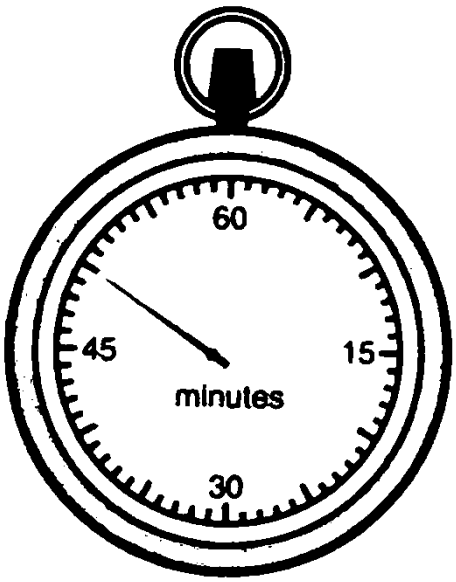
Water Sample	Observations		Reading on a stopwatch	Time taken (minute)
	Initial	End		
R				
S				

Table 1

(a) Record the readings on the stopwatch in Table 1. [3 *marks*]

(b) (i) Based on Table 1, state two observations on the time taken for the methylene blue solution to decolourise.

Observation 1:

_____

_____

_____

Observation 2:

_____

_____

_____

[3 *marks*]

(ii) State two inferences that correspond to the observations in (b)(i).

Inference from observation 1:

_____

_____

_____

Inference from observation 2:

_____

_____

_____

[3 *marks*]

(c) Complete Table 2 based on this experiment that was carried out.

Variable	Method to handle the variable
Manipulated variable _____ _____ _____	_____ _____ _____ _____

Responding variable _____ _____ _____	_____ _____ _____ _____
Constant variable _____ _____ _____	_____ _____ _____ _____

Table 2 $[3\ marks]$

(d) State the hypothesis for this experiment.

_____

_____

_____

$[3\ marks]$

(e) (i) Construct a table and record all the data collected. Your table should have the following titles:

- time taken for methylene blue solution to decolourise
- rate of decolourisation
- water sample

$[3\ marks]$

(ii) Then, draw a bar graph of the rate of decolourisation against water sample on the graph paper provided.

[3 *marks*]

(f) Describe the relationship between the level of dissolved oxygen in a water sample and the rate of decolourisation.

_____

_____

_____

_____

[3 *marks*]

(g) State the operational definition of biochemical oxygen demand (B.O.D.) based on the results of the experiment.

_____

_____

_____

_____

[3 *marks*]

(h) A student shook the reagent bottle vigorously and left it uncovered during the experiment. Predict the outcome of this experiment. Explain your prediction.

_____

_____

_____

_____

[3 *marks*]

(i) The following list is part of the materials and apparatus in this experiment.

Sewage	Piped water	Effluent
Stopwatch	Methylene blue solution	Syringes
Distilled water	Stopper	

Complete Table 3 based on the list given above.

Material	Apparatus

Table 3

[3 *marks*]

2. A group of Form 5 Science students want to correlate the different sizes of cubes with the total surface area to volume (TSA/V) ratio, by studying how the TSA/V ratio affects the rate of diffusion of red ink into the interior of cubes.

Based on the above information, design a laboratory experiment which the students can conduct to determine the relationship between total surface area to volume ratio and its effect of diffusion.

The planning of this experiment must include the following aspects:

- Problem statement
- Hypothesis
- Variables
- List of apparatus and materials
- Experimental procedure
- Presentation of data

[17 *marks*]

---------- END OF QUESTION PAPER ----------

Prepared by: Checked by: Approved by:

Yeap Chee Beng

July 2014