SKEMA BIOLOGI KERTAS 3

<table>
<tr><th>Question</th><th>Criteria</th><th>Score</th></tr>
<tr><td>1 (a)</td><td>Able to record all the data for volume of the urine collected and average of urine produce correctly.

<u>Sample answers</u>

<table><tr><th>Type of Vegetables</th><th>Amount of Filtrate needed to decolorize DCPIP solution (ml)</th></tr><tr><td>Cauliflower</td><td>4.2</td></tr><tr><td>Broccoli</td><td>2.5</td></tr><tr><td>Lime</td><td>3.6</td></tr><tr><td>Ascorbic Acid</td><td>1.0</td></tr></table></td><td>3</td></tr>
<tr><td></td><td>Able to record 3 data correctly</td><td>2</td></tr>
<tr><td></td><td>Able to record 2 data correctly</td><td>1</td></tr>
<tr><td></td><td>Able to record only 1 data / wrong response</td><td>0</td></tr>
<tr><td>(b) (i)</td><td>Able to state two different observation correctly base on the criteria:
C1 – Type of vegetables
C2 – Amount of Filtrate needed to decolorize DCPIP solution (ml)

<u>Sample answers</u>

1. The amount of Cauliflower/ Broccoli/ Lime/ Ascorbic Acid filtrate needed to decolorize DCPIP solution is 4.2 ml/ 2.5 ml/ 3.6ml/ 1.0ml
2. The amount of Cauliflower filtrate needed to decolorize DCPIP solution is higher than the amount of Broccoli filtrate.</td><td>3</td></tr>
<tr><td></td><td>Able to state one correct observation and one inaccurate observation.

<u>Sample answer (inaccurate)</u>
1. The amount of cauliflower filtrate needed to decolorize DCPIP solution the highest</td><td>2</td></tr>
<tr><td></td><td>Able to state only one correct observation or two observations at idea level.

<u>Sample answer (idea)</u>
1. The amount of vegetables filtrate needed to decolorize DCPIP solution is different</td><td>1</td></tr>
<tr><td></td><td>No response or incorrect response or inaccurate observation or one idea only.</td><td>0</td></tr>
</table>

<table>
<tr><th>Question</th><th>Criteria</th><th>Score</th></tr>
<tr><td>(b) (ii)</td><td>Able to make two accurate inferences base on two criteria:
C1 – amount of vegetable filtrate
C2 – content of vitamin C

<u>Sample answer</u>

1. Amount of vegetable filtrate needed to decolorize DCPIP solution is high, the content of vitamin C in the vegetables filtrate is low.
2. Amount of vegetable filtrate needed to decolorize DCPIP solution is low, the content of vitamin C in the vegetables filtrate is high.</td><td>3</td></tr>
<tr><td rowspan="3"></td><td>Able to make <u>one</u> correct inference and <u>one</u> inaccurate inference or able to state <u>two</u> inaccurate inferences.

<u>Sample answer</u> (inaccurate)
1. More / high / much (amount) of vegetable filtrate.
2. Low/ high content of Vitamin C</td><td>2</td></tr>
<tr><td>Able to sate one correct inference or two inferences at idea level.
<u>Sample answer (idea level)</u>
1. The content of vitamin C is different</td><td>1</td></tr>
<tr><td>No response or inaccurate response</td><td>0</td></tr>
<tr><td></td><td>Summary of scoring for 1(b)(i) and 1(b)(ii)
<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="3">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 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>Question</th><th>Criteria</th><th>Score</th></tr>
<tr><td>(c)</td><td>Able to state all variables and methods to handle each variable correctly.
<u>Sample answer</u>

<table>
<tr><th>Variable</th><th>Method</th></tr>
<tr><td>Manipulated variable:
Types of Filtrate</td><td>Use different type of filtrate</td></tr>
<tr><td>Responding variable:
• Volume of filtrate needed to decolorize DCPIP solution</td><td>• Measure and record the volume of vegetable filtrate needed to decolorize DCPIP solution using syringe
• Calculate and record the percentage of Vitamin C using the formula :

Amount of Ascorbic Acid needed to decolorize

<u>DCPIP solution(ml)</u> x 0.1%

Amount of Filtrate needed to decolorize DCPIP solution(ml)</td></tr>
<tr><td>Initial volume of filtrate/ volume of DCPIP solution</td><td>Fix the initial volume of filtrate which is 5ml / volume of DCPIP solution which is 1ml</td></tr>
</table></td><td></td></tr>
<tr><td></td><td>Able to state 4 – 5 ticks</td><td>2</td></tr>
<tr><td></td><td>Able to state 2 – 3 ticks</td><td>1</td></tr>
<tr><td></td><td>No response or incorrect response or 1 tick only</td><td>0</td></tr>
<tr><td>(d)</td><td>Able to state the hypothesis relating the manipulated variable and the responding variable correctly based on three criteria:
P1 : Manipulated variable (volume of water intake)
P2 : Responding variable (volume of urine collected)
H : Relationship of the variables.

<u>Sample answer</u>
1. Broccoli has the highest amount of Vitamin C compared to</td><td>3</td></tr>
</table>

	Cauliflower, and Spinach. *P1 + P2 + H*	
	Able to state the hypothesis based on any two criteria. <u>Sample answer</u> 1. The amount of filtrate needed to decolorize DCPIP solution affects the content of Vitamin C. 2. Different amount of filtrate needed to decolorize DCPIP solution, different content of Vitamin C. *P1 + P2 // P1/P2 + H*	2
	Able to state the hypothesis based on any one criteria or idea level. <u>Sample answer</u> 1. The content of Vitamin C is different.	1

<table>
<tr><th>Question</th><th>Criteria</th><th>Score</th></tr>
<tr><td>(e) (i)</td><td>Able to construct a table correctly with the following aspects:
T : Title with correct unit - 1 mark
D : Data - 1 mark
C : Percentage of Vitamin C - 1 mark

<u>Sample answer</u>

<table>
<tr><th>Type of filtrate</th><th>The amount of filtrate needed to decolorize DCPIP solution (ml)</th><th>Percentage of Vitamin C (%)</th></tr>
<tr><td>Cauliflower</td><td>4.2</td><td>0.02//0.022</td></tr>
<tr><td>Broccoli</td><td>2.5</td><td>0.04</td></tr>
<tr><td>Lime</td><td>3.6</td><td>0.03//0.027</td></tr>
<tr><td>Ascorbic Acid</td><td>1.0</td><td>0.1</td></tr>
</table>
</td><td>3</td></tr>
<tr><td></td><td>Any two aspect correct</td><td>2</td></tr>
<tr><td></td><td>Any one aspect correct</td><td>1</td></tr>
<tr><td></td><td>Incorrect response</td><td>0</td></tr>
<tr><td>(ii)</td><td>Able to draw the graph of volume of water reabsorb against volume of water intake based on the following aspects:
P (Paksi): Title of x-axis and y-axis with unit - 1 mark
Title (Title) : Four points plotted correctly - 1 mark
B (Bentuk) : All points connected smoothly - 1 mark
All three aspect correct</td><td>3</td></tr>
</table>

	Any two aspect correct	2
	Any one aspect correct	1
	No response or Incorrect response	0
(f)	Able to explain the relationship between the amount of vegetable filtrate needed to decolorize DCPIP solution and type of filtrate base on the following criteria. R1 : Relationship - R2 : the amount of vegetable filtrate to decolorize DCPIP R3 : the concentration of vitamin C <u>Sample answer</u> Broccoli has the highest amount of vitamin C compared to cauliflower and Lime. This is because the amount of vegetable filtrate needed to decolorize DCPIP is low, thus the concentration of vitamin C is high enough which needed only small amount of flitrate to reduce DCPIP solution.	3
	Able to explain the relationship using any two aspects	2
	Able to explain the relationship using any one aspect only	1
	No response or Incorrect response	0

Question	Criteria	Score
(g)	Able to predict and explain the volume of urine produced based on the following criteria : P1 : Prediction - More than 4.5 ml P2 : Explanation - denaturation of vitamin C P3 : Concentration of filtrate needed to decolorize DCPIP solution <u>Sample answer</u> Volume of filtrate needed to decolorize DCPIP solution is more/ higher than 4.5ml. This is because boiling causes Vitamin C to denature. Thus there is less/ no vitamin C concentration in filtrate to decolorize DCPIP solution	
	Able to predict and explain the volume of urine produced based on any two criteria	2
	Able to predict and explain the volume of urine produced based on any one criteria	1
	No response or Incorrect response	0
(h)	Able to define Vitamin C operationally based on the following criteria. D1 : D2 : D3 :	

	Sample answer 3	
	Any two criteria stated	2
	Any one criteria stated	1
	No response or Incorrect response	0

Question	Criteria	Score
(i)	Able to classify apparatus and materials into their respective variables. Sample answer Materials: Ascorbic Acid, Fruit Juices, DCPIP Solution Apparatus: Syringe with needle, Specimen Tube, Measuring Cylinder All 6 corrects in its appropriate correct.	3
	5 – 4 correct	2
	3- 2correct	1
	1 – 0 No response or Incorrect response	0

Paper 3 – No 2 (Scheme)

Item	Criteria	Marks
	Problem statement Able to state the problem statement of the experiment **correctly** based on three criteria: ▪ Manipulated variables – (different) water sources/ samples (P1) ▪ Responding variables – time taken to decolourise methylene blue solution // level of polution (P2) ▪ Relationship in **question form** and **question symbol [?] (H)** **Sample Answer** 1. **What** is the time taken to decolourise methylene blue solution// level of pollution of different water sources/samples **?** 2. **Does** different water sources/samples has different time taken to decolourise methylene blue solution// level of pollution **?**	3 marks
	Able to state the problem statement of the experiment **correctly** based on any **two** criteria. Sample Answer 1. What is the time taken to decolourise methylene blue solution// level of pollution of different water sources/ samples.	2 marks
	Able to state the problem statement of the experiment **correctly** based on only **one** criteria. Sample Answer 1. What is the time taken to decolourise methylene blue solution / level of pollution of water sources/ sample. 2. Water sources/ samples have different level of pollution.	1 mark
	Wrong or no response	0 mark

Item	Criteria	Marks
	Hypothesis Able to state the hypothesis of the experiment **correctly** based on three criteria: ▪ Manipulated variables – different water sources/ samples (P1) ▪ Responding variables – time taken to decolourise methylene blue solution /level of pollution (P2) ▪ Relationship – more/less than//higher/lower than // shortest//most (H) Sample Answer 1. Water sample A/ drain water took the **shortest** time to decolourise methylene blue solution compared to water sample B, C and D. 2. Drain water /water sample A is the **most** polluted samples of water collected.	3 marks
	Able to state the hypothesis of the experiment **correctly** based on two criteria: Sample Answer 1. Different sources of water samples affect the time taken for the methylene blue solution to decolourise .	2 marks
	Able to state the hypothesis of the experiment **correctly** based on one criteria: Sample Answer 1. The drain water is polluted	1 mark
	Wrong or no response	0 mark

Item	Criteria	Marks
	Variables Able to state the variables of the experiment **correctly** that include three criteria: Manipulated : different water sources/ samples Responding : time taken to decolourise methylene blue solution // level of polution Constant : volume of water samples// volume of methylene blue solution	3 marks
	Able to state the variables of the experiment **correctly** that include two criteria.	2 marks
	Able to state the variables of the experiment **correctly** that include one criteria	1 mark
	Wrong or no response	0 mark

Item	Criteria	Marks
	Materials Methylene blue solution, water samples from A, B, C and D **Apparatus** Syringe with needle, stop watch, Reagent bottle, stopper and beaker	3 marks 2M + 5A
	Materials	

	Two materials **Apparatus** Any three apparatus (**syringe and stop watch are compulsory**)	2 marks 2M + 3A
	Materials Two materials **Apparatus** Two apparatus (**syringe and stop watch**)	 1 mark 2M + 2A
	Cannot state the functional materials and apparatus	0 mark

Item	**Criteria**	Marks
	Procedure Able to state **five** Ks correctly. K1 : Preparation of materials & apparatus (3K1) K2 : Operating fixed variable (1K2) K3 : Operating responding variable (1K3) K4: Operating manipulated variable (1K4) K5 : Precaution (1K5)	3 marks
	Able to state any **three** Ks correctly	2 marks

	Able to state any **two** Ks correctly	1 marks
	Able to state only **one** K correctly or no response	0 marks
	Example for procedure K1: Preparation of materials & apparatus 1. Water samples are collected from four different sources A,B,C and D 2. The reagent bottles are labelled 1, 2, 3 and 4 3. The reagent bottles are closed with the stopper immediately 4. The stopwatch is activated 5. The bottles are examined from time to time 6. The results are tabulate.	
	K2: Operating fixes variable 1. Measure **250 ml of water sample** from A, B, C and D separately and pour into the reagent bottle labelled 1, 2, 3 and 4 respectively 2. **1 ml of methylene blue solution** is added to each water sample using a syringe	
	K3: Operating responding variable 1. The time taken for the methylene blue solution to decolourise is **measured and recorded** in the table **using stop watch**.	
	K4: Operating manipulated variable 1. Measure 250 ml of **water samples from A, B, C and D** separately and pour into the reagent bottle labeled 1, 2, 3 and	

	4 respectively	

Item	Criteria	Marks
	K5: Precaution **1.** 1 ml of methylene blue solution is **added to the base of** each water sample using a **syringe with needle** **2.** The reagent bottles are **closed with stopper immediately** 3. The contents of the bottles cannot be shaken. 4. All the reagent bottles are kept in a dark cupboard	
	Sample answer: Method / procedure : 1. Water samples are collected (K1) from 4 different water resources (K3) *(A,B,C and D). 2. The reagent bottles are labelled 1, 2, 3 and 4 3. 250 ml of water samples (K2) is measured (K1) from 4 different water Resources (A, B, C and D) separately and pour (K1) into the reagent bottle labeled 1, 2, 3 and 4 respectively. 4. 1 ml (K2) of methylene blue solution is added (K1) to the base (K5) of each water sample using a syringe with needle. 5. The reagent bottles are closed with stopper immediately. (K5) 6. The content of the bottles cannot be shaken. (K5) 7. All the reagent bottles are kept in a dark cupboard. (K5) 8. The stop watch is activated. (K1) 9. The bottles are examined (K1) at one hour interval. 10. The time taken for the methylene blue solution to decolourise is measured and recorded for all the water samples using stop watch. (K3) 11. The result is tabulated. (K1)	*Tap, drain, river, pond.

<table>
<tr>
<td></td>
<td>Presentation of data

1. Able to state all the titles correctly with units.

2. Able to state 4 water samples.

<table>
<tr><th>Water samples</th><th>Time taken for methylene blue solution to decolourise (hour)</th></tr>
<tr><td>Tap water</td><td></td></tr>
<tr><td>Drain water</td><td></td></tr>
<tr><td>River water</td><td></td></tr>
<tr><td>Pond water</td><td></td></tr>
</table>
</td>
<td>2 marks</td>
</tr>
<tr>
<td></td>
<td>Able to state any one criteria only</td>
<td>1 mark</td>
</tr>
</table>

END OF MARKING SCHEME