4551/2
Biologi
Kertas 1/2/3
Ogos 2012

PEPERIKSAAN PERCUBAAN

SIJIL PELAJARAN MALAYSIA 2014

BIOLOGI

KERTAS 1/2/3

PERATURAN PEMARKAHAN

UNTUK KEGUNAAN PEMERIKSA SAHAJA

BIOLOGY PAPER 1 (4551/1)

1	B	11	B	21	D	31	D	41	D
2	A	12	B	22	C	32	C	42	A
3	C	13	A	23	C	33	A	43	C
4	A	14	B	24	B	34	D	44	D
5	D	15	B	25	C	35	D	45	D
6	D	16	C	26	D	36	A	46	B
7	C	17	D	27	D	37	D	47	A
8	D	18	D	28	C	38	A	48	A
9	C	19	D	29	C	39	A	49	B
10	C	20	A	30	A	40	B	50	D

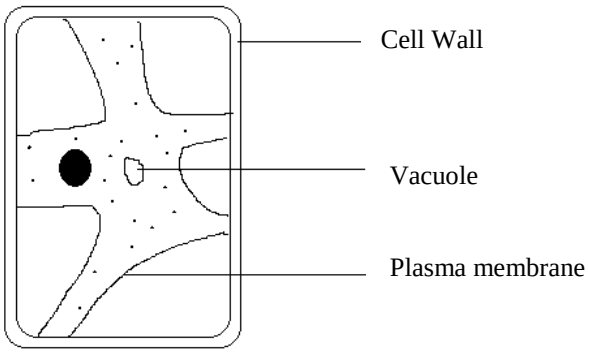
BIOLOGY PAPER 2 (4551/2)

Question 1

Item No	Suggested answer	Marks	
1 (a) (i) (ii)	Plant cell / leaf/ mesophyll cell Plant cells have chloroplasts	1 1	2
(b) (i)	*P:* Granum; *Q:* Cisterna*; R*: Crista	3	3
(ii)	*P*: Granum	1	1
(c) (i)	*Y* functions as a processing, packaging and transport centre of carbohydrates, proteins and glycoproteins in the form of vesicles; forms lysosomes	1	1
(ii)	1. Both contain DNA / ribosomes 2. Both process an envelope of two membranes	1 1	2
(iii)	*X*-chloroplast	1	1
(d) (i) (ii)	Mitochondria / organelle *Z* produce energy which is needed for active transport of ions in the root Energy is needed for the contraction of muscles	1 1	2
	Total	**12 marks**	

Question 2

Item No	Suggested answer	Marks	
2 (a)	II, IV, I	1	1
(b)	I : Cytokinesis /*Sitokinesis* II : Metaphase / *Metafasa* III : Prophase / *Profasa* IV : Anaphase / *Anafasa*	2	2
(c)	-The plasma membrane constricts around the equator of the cell - Dividing the cytoplasm into two daughter cells.	1 1	2
(d) (i) (ii)	- Cloning / *Pengklonan* - The shoot apex of orchid shoot is cut off. - The tissues are cultured in a sterile medium containing nutrients and plant hormones. - The tissues undergo repeated mitosis to produce mass of tissue called a callus. - Then they differentiate to form roots. Shoots are formed and many whole new orchids are produced.	1 1 1 1	4

(e)	1. In animal, during cytokinesis, the cleavage furrow form dividing the cytoplasm into two daughter cells; while in plant, cell plate form at the equator of the cell. 2. Centriole present in animal cell to form spindle fibre but absent in plant cell. Max 3	1 1 1 1	3
(ii)	Sample Answer  D- The shape of the cell must be rectangular. The cell wall is drawn with double line The vacuole must be large L - Label vacuole, and plasma membrane * Reject other shape of the cell.	1 1	2
	TOTAL	**12**	

Question 3

No. soalan	Cadangan jawapan	Markah
3 (a)(i)	Namakan proses K dan L. Proses K : Fotosintesis Proses L : Transpirasi	 1 1
3 (a)(ii)	Nyatakan bagaimana bahan tersebut diangkut dalam tumbuhan. • Glukosa diangkut melalui floem ke seluruh bahagian tumbuhan yang lain / ke organ simpanan	 1

3 (a)(iii)	Huraikan proses M. • Kepekatan ion kalium di dalam sel rambut akar adalah hipertonik berbanding kepekatan ion kalium di dalam tanah • Ion kalium akan diangkut ke dalam sap sel rambut akar • Secara pengangkutan aktif	 1 1 1
3 (b)	Nyatakan dua kepentingan proses L kepada tumbuhan tersebut. • Membantu dalam menyerap dan mengangkut air & ion mineral dari akar ke bahagian lain pada tumbuhan • Mengelakkan kelayuan pada tumbuhan • Mengangkut air untuk proses fotosintesis • Agen penyejuk dalam tumbuhan *Mana-mana 2 sahaja*	 1 1 1 1
3 (c)	Terangkan bagaimana keadaan ini boleh berlaku pada batang tumbuhan tersebut. • Lapisan tisu floem telah dikeluarkan / digelangkan dari tumbuhan • Menghalang pengangkutan hasil fotosintesis ke bahagian lain pada tumbuhan	 1 1
3 (d)	Terangkan kesan kedua-dua keadaan ini terhadap proses L. Tiupan angin sebelah pagi : • Apabila pergerakan udara perlahan / rendah, kadar transpirasi akan rendah / menurun Tiupan angin sebelah petang : • Apabila pergerakan udara semakin kencang / tinggi, kadar transpirasi akan tinggi / meningkat	 1 1

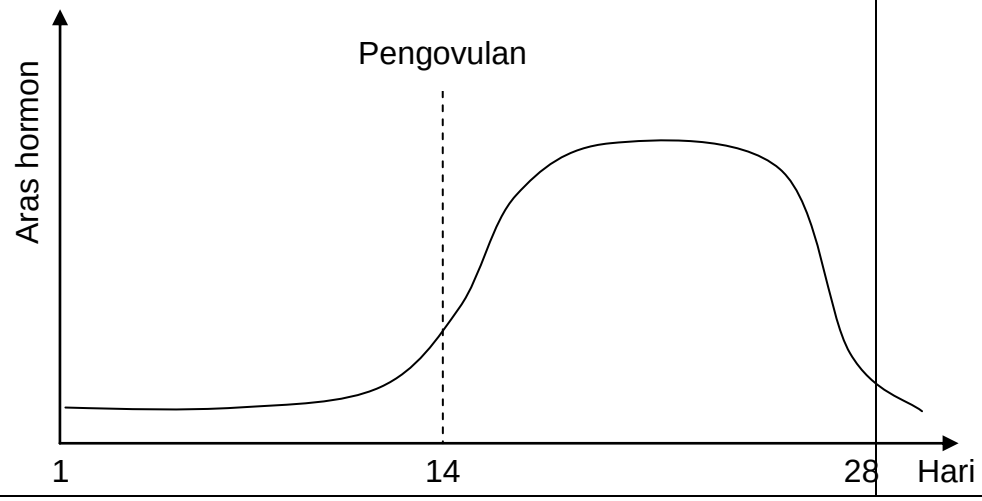
Question 4

No. soalan	Cadangan jawapan	Markah
4 (a)(i)	Nyatakan kelenjar Q dan hormon R. Kelenjar Q : Kelenjar adrenal Hormon R : Adrenalina	 1 1
4 (a)(ii)	Berdasarkan rajah diatas, nyatakan fungsi otak. • Menerima impuls saraf daripada reseptor • Mentafsir maklumat lalu menghantar maklumat ke kelenjar Q	 1 1

4 (a)(iii)	Terangkan kesan perembesan hormon R terhadap peparu dan jantung. Peparu • Meningkatkan kadar pernafasan Jantung • Meningkatkan kadar denyutan jantung • Meningkatkan tekanan darah • Meningkatkan pengaliran darah ke otot Mana-mana 1 untuk jantung	 1 1 1 1
4 (b)	Terangkan bagaimana kelenjar S boleh berperanan untuk menghadapi situasi di atas. • Kelenjar S ialah pankreas • Pankreas merembeskan hormon glukagon untuk menukarkan glikogen kepada glukosa • Paras glukosa dalam darah meningkat • Kadar metabolisme turut meningkat untuk menghasilkan lebih banyak tenaga Mana-mana 3 sahaja	 1 1 1 1
4 (c)	Jelaskan kedua-dua pilihan gerakbalas tersebut bagi menghadapi situasi diatas. Gerakbalas 'Lawan' - Menyerang balas terhadap ular / membunuh ular Gerakbalas 'Lari' - Lari / menjauhkan diri daripada ular Terima jawapan yang sesuai	 1 1

Question 5

No. soalan	Cadangan jawapan	Markah
5 (a)(i)	Namakan sel berlabel A dan nyatakan bilangan kromosom sel A dan sel B. Sel A : Spermatosit primer Jenis sel | Sel A | Sel B Bilangan kromosom | 46 | 23	 1 1

5 (a)(ii)	Terangkan apa yang berlaku yang menyebabkan perbezaan bilangan kromosom antara sel A dan sel B. • Sel B mempunyai bilangan kromosom yang separuh daripada sel A • Setelah menjalani proses pembahagian meiosis	 1 1
5 (b)	Terangkan kepentingan pembentukan gamet dalam manusia. • Bagi mengekalkan bilangan kromosom diploid (2n) dari generasi ke generasi • Membolehkan variasi genetik berlaku pada keturunan • Meningkatkan kesinambungan spesies Mana-mana 2 sahaja	 1 1 1
5 (c)(i)	Pada graf diatas, lengkapkan graf tersebut bagi menunjukkan aras hormon progesteron selepas hari ke-15 pada wanita tersebut.  	 1

Question 6

No	Section	Description/explanation	Marks	
6	(a)(i)	Able to explain the digestion of butter. Sample answer: • (Butter) contains lipids / fats • Digestion occurs in the duodenum / ileum • The bile salts emulsify the fats / turn into tiny droplets • (Catalyses by enzyme) lipase • By hydrolysis • Fat into fatty acids and glycerol Any 4	 1 1 1 1 1 1	4

	(ii)	Able to describe the absorption and assimilation of the food taken in during breakfast. Sample answers: **Absorption** • Products of digestion: **glucose, amino acids, fatty acids and glycerols.** • **Glucose and amino acids** diffuse into the blood capillaries of villi • These substances are carried by the hepatic portal vein to the liver and then distributed to the body cell by the circulatory system. • **Fatty acids and glycerols** diffuse into the lacteal of villi. • These substances are carried by a larger lymphatic vessel called thoracic duct. • The thoracic duct carries the contents of the lacteal into the bloodstream via the left subclavian and is then distributed to the body cell by the circulatory system. Any 2 **Assimilation** **i) Glucose** • In body cells , glucose is oxidized to release energy in cellular respiration • Excess glucose is converted into glycogen • and stored in the liver / muscles • (When liver is saturated with glycogen) glucose is converted into fats Any 1 .(ii) Amino acids • In liver, amino acid used to synthesis plasma protein/ cell cytoplasm / muscle cells • In liver, deamination occur. • Excess amino acids converted into ammonia and then to the urea. • Urea is then eliminated by the kidney as a urine. • In body cell, amino acid used for growth. • In body cell, amino acid used to repair damage tissues. • In body cell, amino acid used to produce enzyme, hormone and antibody. Any 2 (iii) Fats • Used in building plasma membrane / cell membranes • Excess fats are stored in adipose tissues Any 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	6

	(b)	**Sample answer** P1 : The menu is not a balanced diet // does not contain the 7 classes of food in appropriate ratio P2 : Menu is highly rich in carbohydrates and fats // no vegetables and lack of vitamins // Higher energy intake compare to energy requirement for a girl aged 15 <u>Consequences</u> **Sample Answer** **P3 : Constipation** P4 : lack of fiber , faeces moving to slowly through the colon **P5 : Scurvy** P6 : lack of vitamin C //any other vitamins deficiency with explanation **P6 : Obesity** P7 : increase in body weight drastically due to energy requirement is less then energy intake **P8 : Diabetes mellitus** P9 : excess of glucose contain in blood , food is highly rich in carbohydrates **P10 : Arteriosclerosis** P12 : fats deposited in the lumen of blood vessel **P13 : Heart attack** P14 : blockage in the coronary artery // Any other cardiovascular diseases with explanation *Any 4 consequences* *Max 9* **TOTAL**	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 20	1 9

Question 7

Item No	Suggested answer	Marks	
7 (a)	**Comparison hinge joint (H) and ball socket joint (B).** **Similarities:** F1: Both joint H and joint B has a cavity filled with **synovial fluid**// lined with synovial membrane. P1: Synovial fluid acts as lubricant to reduce friction between bones// absorbs shock of the movement. F2: The end surfaces of the humerus bone of joint H and joint B are covered with **cartilage.** P2: To protect the bone/ reduce friction between the bones. F3: Both joint H and B are connected with **ligaments.**	1 1 1 1 1	Max 5

	P3: to absorb shock// reinforce/ strenghthen the articulation of bones/ joint//prevent dislocation of joint **Differences:** D1: Joint H allows the **movement** of bones in one plane/ direction while joint B allows rotational movement of bones in all directions. D2: Joint H is the point where the distal end of humerous **articulates** with the ulna and radius while joint B is the point where proximal end of humerous articulates with the scapula.	1 1 1	
(b)	**Bending of Forearm** F1: The action **biceps muscles and triceps muscles are antagonistics.**. P1: When biceps muscle contracts, P2: the triceps muscle relaxes, P3: The tendons transmit the pulling force produced by the contraction to the **radius.** P4: resulting in the bending of elbow joint// the forearm moves upwards.	1 1 1 1 1	Max 5
(c)	P1: Arthritis is a **skeletal disorder** that **involve inflammation of the joints.** P2 : The joint become **swollen**, **stiff and painful**. P3 : One type of arthritis is called **osteoarthritis**. P4 : Osteoarthritis is part of the **ageing process**, and is **caused by wear and tear of the cartilage inside certain joints.** P5: The ageing process may also result in a **decreases production of synovial fluid in the joint.** P6 : If treatment fails to relieve the pain, a **surgeon** can **replace the damaged joints with artificial ones made of plastic or metal.**	1 1 1 1 1 1	Max 5
(d)	P1: When the flexor muscle relax P2: the extensor muscle contract P3: the leg jerk backwards P4: propelling the grasshopper forwards and P5: upwards into the air	1 1 1 1 1	Max 5
	TOTAL	**20**	

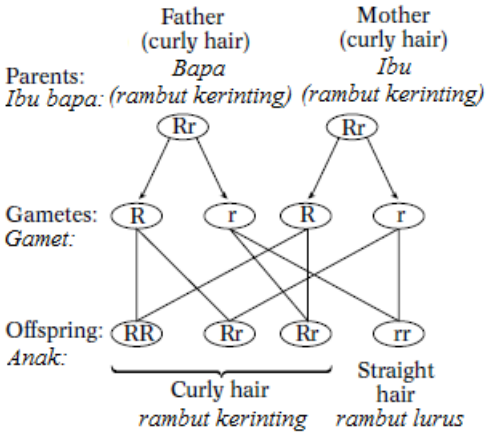
Question 8

Item No	Suggested answer	Marks	
8(a)(i)	P1: Water can be polluted by biological agents such as bacteria, protozoa and viruses.	1	max 3
	P2: Chemical fertilisers with high phosphate or nitrate content leach from agricultural lands into a river or lake.	1	
	This can encourage the growth of algae, thus interferring with the balance of the ecosystem of the water.	1	
	P3: Toxic chemical substances such as arsenic, cyanide and lead that are discharged from factories can pollute the water.	1	
	P4: Rubbish and human waste that are disposed of into sources of water can encourage the growth of microorganisms, which then reduce the oxygen content of the sources of water.	1	
	P5: Agricultural waste such as herbicides and pesticides that are disposed of into the sources of water will kill aquatic organisms.	1	
	P6: Infertility in humans may arise if water contaminated with pesticides and herbicides is consumed	1	
	P7: Dissolved herbicides and pesticides can poison an organism that drinks the contaminated water.	1	
	P8: The pesticides may accumulate in the tissues of the organisms in each trophic level in a food chain and this can cause the final consumers to die.	1	
	P9: Oil spills caused by collision of oil tankers can pollute the sources of water and subsequently kill many living organisms such as seabirds.	1	
	P10: The layer of oil on the water surface prevents oxygen from dissolving in the water, thus causing aquatic creatures to die.	1	
	P11: Submerged plants are unable to carry out photosynthesis to manufacture food when there is a layer of oil on the surface.	1	
	P12: Solid sediments can lower the quality of the water and increase the amount of silt in the rivers. This can lead to flash floods.	1	
	P13: The presence of acids or alkalis can kill most of the aquatic organisms as they usually survive in neutral conditions.	1	
	P14: Acids or alkalis can also destroy the photosynthetic tissues of plants, reducing the rate of photosynthesis.		
	P15: Non-biodegradable detergents can reduce the oxygen supply to the aquatic organisms.		
	P16: Mercury and lead may affect the human nervous system. [1 m]		
8(a)(ii)	P1: Eutrophication is a condition caused by an increase in the concentration of mineral salts such as nitrates and phosphates in a body of water (e.g. a lake) which provides a favourable condition for aquatic plants to grow.	1	Max: 4
	P2: The discharge of untreated sewage encourages the rapid growth of organisms such as algae, resulting in a population explosion of algae.	1	
	P3: The algae grow rapidly and form a thick scum on the water surface and this prevents light from reaching the bottom of the water.	1	
	P4: When the algae die, they form humus at the bottom of the river. The algae are decomposed by aerobic bacteria, which use up oxygen at very fast rate.	1	
	P5: The decomposition of algae by bacteria raises the BOD level and reduces the oxygen content of the water. [1 m]	1	

8(a) (iii)	P1: Eutrophication occurs because of excess nitrates and phosphates in fertilisers P2: control the use of fertilisers by P3: applying fertilisers only when crops are growing P4: not applying fertilisers on empty field P5: not spraying when there is a forecast of rain P6: not disposing fertilisers into rivers and ponds P7: reducing the usage of excess nitrates from fertilisers and ammonia	1 1 1 1 1 1 1	Max: 3
8 (b) (i)	P1: Global warming is the gradual increase in the average temperature of the earth's atmosphere caused by greenhouse gases (such as CO2) which are able to absorb and retain much heat energy from the sun, causing atmospheric temperatures to rise. P2: Trees help to remove carbon dioxide from the atmosphere during photosynthesis. P3: If used paper is recycled, then fewer trees would be cut for manufacturing paper. More trees would absorb more carbon dioxide from the atmosphere during photosynthesis. P4: This slows down the rise in the carbon dioxide concentration in the atmosphere. P5: Less carbon dioxide in the atmosphere will help alleviate/reduce the greenhouse effect. P5: A reduced greenhouse effect would slow down global warming.	1 1 1 1 1 1	Max: 5 m
8 (b) (ii)	P1: global warming leads to changes in wind direction P2: and distribution of rainfall P3: as aresult, agricultural activities are affected P4: global warming causes weather pattern to change P5: pests and vectors may spread to new areas because of warmer climates P6: warmer climates leads to an expansion of territories for disease-carrying vectors P7: resulting increasing in the outbreaks of disease suh as malaria and dengue fever	1 1 1 1 1 1 1	Max 5
	Total	**20 m**	

Question 9

Item No	Suggested answer	Marks	
9 (a) (i)	P1: the characteristics : seed shape, seed colour, pod colour and flower colour P2: traits : round and wrinkle, yellow and green, inflated and constricted, green and yellow , purple and white	2 2	Max 4

9 (a) (ii)	P1: Genotype for straight hair is homozygous recessive; the genotype must be rr. P2: If both parents are straight hair, the father must be rr and the mother must also be rr. P3: So, only the recessive genes (rr) for straight hair will be inherited.  	1 1 1 1 1 1 1	Max 4
9 (b) (i)	P1: Since the characteristic is said to be sex-linked, it is found on the sex chromosomes. P2: Since both parents were normal and produce a redgreen colour-blind son, this indicates that: - the colour-blind allele is recessive. - the mother was a carrier. (If she were homozygous for normal vision, she could not have produced a colour-blind son; and if she were homozygous recessive she would be colourblind) P3: So, let 'B' represent the allele for normal vision and 'b' to represent the allele for red-green colour blindness. • The father is normal, so he must be X^BY. • The mother is a carrier, so she must be X^BX^b. . . **Male gametes** ***Gamet lelaki*** / **Female gametes** ***Gamet perempuan*** X^B | Y X^B | X^BX^B | X^BY X^b | X^BX^b | X^bY	1 1 1 1 1 1 1 2	8 MARK

9 (b) (ii)

Down's syndrome *Sindrom Down*	**Criteria** *Kriteria*	**Colour-blindness** *Buta warna*
Genetic disease caused by gene mutation of the autosomal chromosomes number 21 *Penyakit genetik yang disebabkan oleh mutasi gen pada autosom ke-21*	Causes *Sebab*	Hereditary sex linked disease caused by a recessive allele found on the X sex chromosome *Penyakit pewarisan terangkai seks disebabkan oleh alel resesif yang terdapat pada kromosom seks X*
Abnormal *Tak normal*	Number of chromosomes *Bilangan kromosom*	Normal *Normal*
Have flat, broad faces, slanted eyes, protruding tongue, tend to be mentally retarded *Mempunyai muka leper dan lebar, mata sepet, lidah terjelir, cenderung mengalami kecacatan mental*	Characteristics *Ciri-ciri*	Unable to differentiate between the colours of red and green *Tidak dapat membezakan antara warna merah dan hijau*
Not inherited *Tidak diwarisi*	Inheritance *Pewarisan*	Inherited *Diwarisi*

1

1

1

1

4 MARK

PAPER 3.

QUESTION 1

<table>
<tr><th>No</th><th>MARK SCHEME</th><th>Score</th></tr>
<tr><td rowspan="4">1(a)
[KB0603 - Measuring Using Numbers]</td><td>Able to record all the data correctly.
Sample answers:
<table>
<tr><th rowspan="2">Group
Kumpulan</th><th rowspan="2">Volume of water intake, ml
Isipadu air yang diminum ml</th><th colspan="2">Volume of urine produced, ml
Isipadu air kencing yang dihasilkan, ml</th></tr>
<tr><th>Student 1
Pelajar 1</th><th>Student 2
Pelajar 2</th></tr>
<tr><td>A</td><td>100</td><td>80</td><td>82</td></tr>
<tr><td>B</td><td>200</td><td>150</td><td>170</td></tr>
<tr><td>C</td><td>300</td><td>200</td><td>250</td></tr>
<tr><td>D</td><td>400</td><td>350</td><td>370</td></tr>
</table></td><td>3</td></tr>
<tr><td>Able to record 6-7 data correctly</td><td>2</td></tr>
<tr><td>Able to record 3-5 data correctly</td><td>1</td></tr>
<tr><td>Able to record only 0-2 data or not able to respond / wrong response.</td><td>0</td></tr>
<tr><td rowspan="2">(b) (i)
[KB0601 - Observing]</td><td>Able to state two different correct observations
C1 – Volume of water intake // Group
C2 – Volume of urine produced

Sample answers:
1. When the volume of water intake is 100 ml / Group A, the volume of urine produced is 80 ml / 82 ml
2. The volume of urine produced in Group P is lower than that in group Q/R/S // vice versa
3. When the volume of water intake is 100 ml / group A, the volume of urine produced is lowest / smallest</td><td>3</td></tr>
<tr><td>Able to state one correct obseravtion and one inaccurate observation.
Sample answer:
1. When the volume of water intake is 100 ml / group A, the volume of urine produced is lower / less / smaller</td><td>2</td></tr>
</table>

	Able to state only one correct observation or two observation at idea level. Sample answer : 1. Volume of urine produced is different 2. The volume of water intake affect the volume of urine Produced 3. Volume of water intake is different	1
	No response or incorrect response or one inaccurate observation or one idea only.	0
(b) (ii) [KB0604 - Making Inference]	**Able to make two correct inferences based on two aspects:** C1 – more / less (amount) of water reabsorbed C2 – higher / lower (blood) osmotic pressure // permeability of (kidney) tubule to water increases / decreases // more / less ADH / aldosterone secreted to the (kidney) tubule Note : Inference must correspond / match to the observation Sample answer : 1. More (amount) of water reabsorbed due to high osmotic pressure 2. More (amount) of water reabsorbed due to high osmotic pressure in group A compare to group B/C/D	3
	Able to state one correct inference and one inaccurate inference or able to state two inaccurate inferences. Sample answer : 1. More / less (amount) of water reabsorbed 2. high / low osmotic pressure 3. more / less ADH secreted into the (kidney) tubule	2
	Able to state only one correct inference or able to state two inference at idea level. Sample answer: 1. water reabsorbed (idea) 2. ADH / aldosterone is secreted (idea) 3. Salt reabsorbed (idea)	1
	No response or incorrect response or one inaccurate inference or one idea only.	0

<table>
<tr>
<td>(c)
[KB0610 - Controlling Variable]</td>
<td>Able to state 3 variables and methods to handle each variable correctly (All ticks)
Sample answer
<table>
<tr><th>Variable</th><th>Method to handle the variable</th></tr>
<tr><td>Manipulated variable
Volume of water intake</td><td>Repeat the experiment by using different volume of water intake</td></tr>
<tr><td>Responding Variable:
Volume of urine produced
//

Average volume of urine produced</td><td>Record the volume of urine produced using measuring cylinder
Calculate average of urine produced using formula,
$\frac{\text{volume of urine produced by student 1} + \text{volume of urine produced by student 2}}{2}$</td></tr>
<tr><td>Constant variable
1. Type of water
2. Number of students in each group
3. Time taken to collect the urine</td><td>1. Use only plain wate
2. Fix the number as two student

3. Fix the time at one hour</td></tr>
</table></td>
<td>3</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 respons or 1 tick only</td><td>0</td></tr>
<tr>
<td>(d)
[KB0611 - State Hypothesis]</td>
<td>Able to state the hypothesis relating the manipulated variable and the responding variable correctly :

P1 : manipulated variable (volume of water intake)
P2 : responding variable (volume of urine produced)
H : relationship

Sample answer

1. As the volume of water intake increases, the volume of urine produced increases
2. The higher volume of water intake increases, the higher volume of urine produced</td>
<td>3

P1 +P2+H</td>
</tr>
<tr>
<td></td>
<td>Able to state a hypothesis relating the manipulated variable and the responding variable but less accurately.
Sample answer :
1. Volume of urine produced depends on the volume of water</td>
<td>2

P1 + P2 //</td>
</tr>
</table>

<table>
<tr><td></td><td>intake
2. Different volume of water intake has different volume of urine produced</td><td>P1/P2 + H</td></tr>
<tr><td></td><td>Able to state one idea of a hypothesis.
<u>Sample answer</u>
1. Volume of water intake increases.
2. Volume of urine produced increases / different.</td><td>1

P1/P2 only</td></tr>
<tr><td></td><td>No response or incorrect respons</td><td>0</td></tr>
<tr><td>(e) (i)
[KB0606 – Communicating data]</td><td>Able to construct a table correctly with the following aspects:

T : Titles with unit - 1 mark
D : Record all data - 1 mark
C : Calculate and record
the average volume of urine produced - 1 mark

<u>Sample answer:</u>
<table>
<tr><td rowspan="2">Volume of water intake, ml
Isipadu air yang diminum ml</td><td colspan="2">Volume of urine produced, ml
Isipadu air kencing yang dihasilkan, ml</td><td rowspan="2">Average volume of urine produced, ml</td></tr>
<tr><td>Student 1
Pelajar 1</td><td>Student 2
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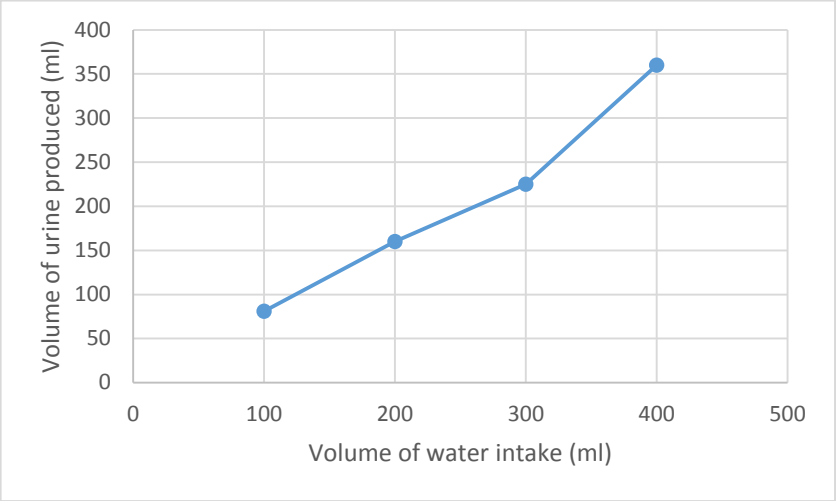
<tr><td>300</td><td>200</td><td>250</td><td>225</td></tr>
<tr><td>400</td><td>350</td><td>370</td><td>360</td></tr>
</table></td><td>3</td></tr>
<tr><td></td><td>Any two correct aspect</td><td>2</td></tr>
<tr><td></td><td>Any one aspect correct</td><td>1</td></tr>
<tr><td></td><td>No response or incorrect respons</td><td>0</td></tr>
<tr><td>(e) (ii)</td><td>Able to draw the graph correctly which include the following aspects :

P(paksi) : Uniform scale, titles and units on both axis - 1 mark
T(Titik) : Plot all points - 1 mark
B(bentuk) : Join all points - 1 mark</td><td>3</td></tr>
</table>

		
	Any two correct aspect	2
	Any one aspect correct	1
	No response or incorrect response	0
(f)	**Able to state the relationship and give reasons correctly based on the following criteria.** R : Relationship E1 : osmotic pressure decrease E2 : less water reabsorbed//less ADH is secreted // kidney tubules less permeable to water <u>Sample answer :</u> The higher the volume of water intake, the higher the (average) volume of urine produced because the osmotic pressure decrease. Thus, less water reabsorbed from kidney.	3 R + any 2E
	Able to explain the relationship using any two aspects.	2 R + any 1E
	Able to explain the relationship using one aspect only.	1 R only
	No response or incorrect respons	0

(g) [KB0605 - Predicting]	**Able to predict and explain the observation of the experiment correctly with the following criteria:** P : volume of urine less than 80 ml // any valu less than 80 ml E1 : osmotic pressure decrease E2 : more water reabsorbed (from kidney) <u>Sample answer</u> volume of urine less than 80 ml // 75 ml because the osmotic pressure increas, so more water reabsorbed (from kidney)	3 P + 2E
	Able to predict with one explanation only	2 P + any 1E
	Able to predict only	1 P only
	No response or incorrect response	0
(h) [KB0609 – define operationally]	**Able to define operationally anaerobic respiration based on the following criteria :** P1 : a <u>process</u> in <u>student</u> P2 : (average) volume of urine produced after one hour P3 : is affected / depends on the the volume of water intake // hypothesis statement <u>Sample answer :</u> 1. Osmoregulation is the <u>process</u> that causes (average) volume of urine produced by <u>student</u> (P1) after one hour (P2). Volume of urine produced is affected by the volume of water intake. (P3)	3
	Any two criteria stated	2
	Any one criteria stated	1
	No response or incorrect response	0

<table>
<tr>
<td>(i)
[KB0602 - Classifying]</td>
<td>Able to classify apparatus and material into their respective variables
<table>
<tr><td></td><td>Manipulated variable</td><td>Responding variable</td><td>Fixed variable</td></tr>
<tr><td>Apparatus / materials</td><td>1. cup / bottle / beaker
2. measuring cylinder
3. water</td><td>1. beaker
2. measuring cylinder
3. urine</td><td>1. stopwatch
2. student
3. (plain) water</td></tr>
</table>
All 9 corrects</td>
<td>3</td>
</tr>
<tr><td></td><td>5-8 corrects</td><td>2</td></tr>
<tr><td></td><td>1-4 corrects</td><td>1</td></tr>
<tr><td></td><td>No response or incorrect respons</td><td>0</td></tr>
</table>

QUESTION 2

Answer		Score
Problem statement:	**Able to state problem statement by relating P1, P2 and P3 in a question form correctly.** P1 – MV : Types of fresh orange juice and cordial orange juice P2 – RV : concentration of vitamin C / volume of fruit juice needed to decolourise 1 ml of DCPIP solution P3: question form…..? <u>Sample answer</u>: Does fresh orange juice contain higher concentration of vitamin C than cordial orange juice?	3 marks P1+P2+P3 Tick
	Able to state problem statement inaccurately <u>Sample answer:</u> 1. Does fresh orange juice contain higher concentration of vitamin C? 2. Does fresh orange juice contain higher vitamin C than exposed orange juice? 3. Does fresh orange juice contain higher concentration of vitamin C than exposed orange juice	2 marks P1+P2/ P1+P3/ P2+P3/ Tick
	Able to state at idea level. <u>Sample answer:</u> Fresh orange juice contains higher concentration of vitamin C.	1 mark P1/P2 Tick
	No response or wrong response	0 mark
Objective	**Able to state the objective correctly** <u>Sample answer:</u> To determine the concentration of vitamin C in fresh orange juice and cordial orange juice	
Hypothesis	**Able to state the hypothesis by relating two variables correctly with the following aspect:** P1 – MV : Types of fresh orange juice and cordial orange juice P2 – RV : concentration of vitamin C // volume of fruit juice needed to decolourise 1 ml of DCPIP solution	3 marks P1+P2+H

	H : relationship Sample answer: 1. Fresh orange juice contains higher concentration of vitamin C compared to cordial orange juice. 2. More volume of fresh orange juice is needed to decolourise I ml of DCPIP solution compared to cordial orange juice.	
	Able to state any 2 aspects correctly or inaccurate hypothesis Sample answer: Types of fruit juice affect the concentration of vitamin C.	2 marks P1+P2/ P1+H/ P2+H/
	Able to state the idea of hypothesis Sample answer: Concentration of vitamin C is different.	1 mark P1/P2
	No response or wrong response	0 mark
Variables	**Able to state all variables correctly** Sample answer Manipulated variables :types of fruit juices // fresh orange juice and cordial orange juice Responding variables : concentration of vitamin C // volume of fruit juice needed to decolourise 1 ml of DCPIP solution Controlled variables : volume of DCPIP solution	3 mark
Apparatus Materials (AM) **05**	**Able to list 4 materials and 4 apparatus correctly to make a functional experiment**. Apparatus (A) 1. Specimen tubes / test tubes 2. Syringe with needles 3. Beaker 4. Knife 5. stopwatch Materials (M)	3 mark **4M + 4A** (A1 + A2 + A3 + A4 /A5)

	1. 0.1% ascorbic acid solution 2. DCPIP solution 3. Fresh orange juice 4. Cordial orange juice	
	Able to list 3 materials and 3 apparatus	2 marks **3M+3A** (A1 + A2 + A3/A4/A5)
	Able to list 2 materials and 2 apparatus	1 marks **2 M +2A** (A1 + A2)
	Able to list any 1 materials and any 1 apparatus	0 mark
	Wrong response or no response	0 Mark
Procedure	**Able to state K1, K2, K3, K4 and K5 correctly**. K1 : The set up of apparatus (steps 1, 2, 3, 4) – at least 3 steps K2 : How to fix the constant variable? (steps 1, 2) – any 1 step K3 : How to operate the responding variable? (steps 4, 5, 7) – all 3 steps K4 : How to operate the manipulated variable? (step 6) K5 : Precaution/Accuracy of experiment (step 4) 1. Fill a specimen tube with 1 ml DCPIP solution using 1 ml syringe. 2. Fill a 5 ml syringe with o.1% ascorbic acid solution. 3. Place the needle of the syringe into the DCPIP solution. 4. Add the ascorbic acid solution to the DCPIP solution drop by drop, stirring gently with the syringe needle until the DCPIP solution becomes colourless. 5. Record the volume of ascorbic solution used. 6. Repeat steps 1 to 5 using fresh orange juice and cordial orange juice. 7. The results are recorded in a table. 8. Calculate and record the concentration of vitamin C by using formula: Concentration of vitamin C = $\frac{\text{volume of 0.1\% ascorbic acid}}{\text{Volume of orange juice}} \times 1.0\ \text{mgcm}^{-3}$	3 marks All 5K
	Able to state any 3 K to 4 K correctly	2 marks
	Able to state any 2 K correctly	1 mark

<table>
<tr><td></td><td>Able to state any 1 K</td><td>0 mark</td></tr>
<tr><td></td><td>Wrong response or no response</td><td>0 mark</td></tr>
<tr><td>Presentation of data</td><td>Able to construct a table to record all data with units correctly

<u>Sample answer :</u>

<table>
<tr><td>Solution / types of fruit juice</td><td>volume of fruit juice needed to decolourise 1 ml of DCPIP solution / ml</td><td>Concentration of vitamin C in orange juice ($mgcm^{-3}$)</td></tr>
<tr><td>Ascorbic acid solution</td><td></td><td></td></tr>
<tr><td>Fresh orange juice</td><td></td><td></td></tr>
<tr><td>Cordial orange juice</td><td></td><td></td></tr>
</table>
</td><td>2 mark</td></tr>
<tr><td>Total Mark</td><td></td><td>17</td></tr>
</table>

END OF MARKING SCHEME

PERATURAN PEMARKAHAN TAMAT