MAJLIS PENGETUA SEKOLAH MALAYSIA
NEGERI SEMBILAN
==========
PROGRAM PENINGKATAN AKADEMIK TINGKATAN 5
SEKOLAH-SEKOLAH NEGERI SEMBILAN 2018

BIOLOGI

SKEMA PEMARKAHAN

MARKING SCHEMES BIOLOGY 2018

BIOLOGI KERTAS 1

BIOLOGI KERTAS 2

BIOLOGI KERTAS 3

KERTAS 1

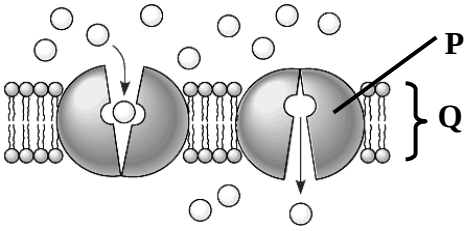
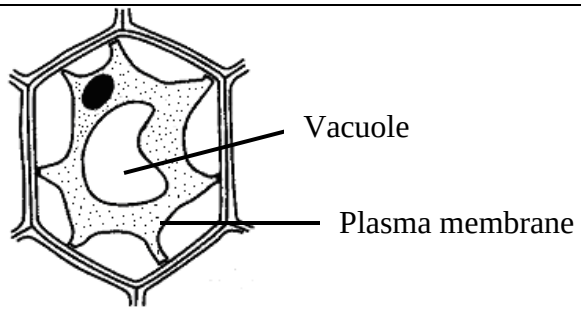
1	D
2	C
3	D
4	B
5	B
6	B
7	B
8	A
9	D
10	A
11	A
12	A
13	C
14	A
15	B
16	B
17	C
18	D
19	B
20	C
21	A
22	C
23	B
24	D
25	C

26	D
27	B
28	D
29	D
30	B
31	C
32	B
33	B
34	D
35	D
36	B
37	D
38	B
39	A
40	D
41	D
42	C
43	D
44	A
45	C
46	A
47	A
48	C
49	B
50	A

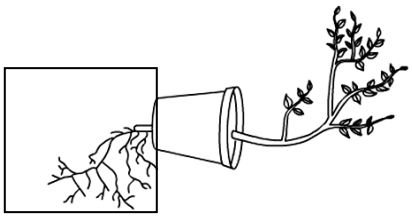
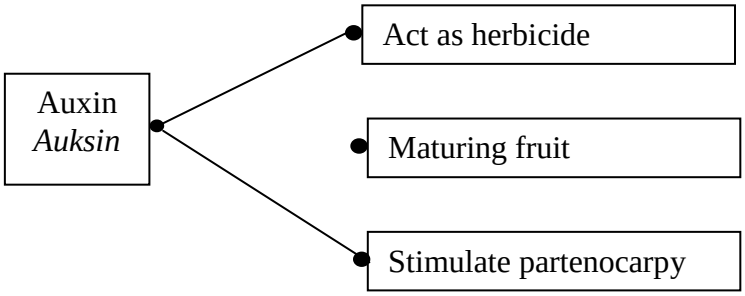
KERTAS 2

SECTION A / BAHAGIAN A

ITEM NO	SCORING CRITERIA	MARKS		REMARKS
1(a)	P : Mitochondrion Q : Plasma membrane R : Golgi body/ apparatus	1 1 1	3	**Reject :** cell membrane
(b)(i)	Phospholipid	1	1	
(ii)	F1 : It forms a bilayer E1 : with the hydrophilic heads facing the cytoplasm and the interstitial fluid // The hydrophobic tails facing each other	1 1	2	**(F1 + E1)** or **(F1 + E2)**
(c)(i)	P : Generates energy (via cellular respiration) // Site of cellular respiration R : Modifies/ packs/ transports proteins / lipids / carbohydrates	1 1	2	
(ii)	F1 : Sperm cells E1 : No energy is generated E2 : Sperm cannot swim/ move/ propel/ to Fallopian tube E3 : No fertilisation occurs or F2 : Muscle cells E4 : No energy is generated E5 : Muscles cannot contract and relax E6 : No movement/ flight or F3 : Meristematic cells E7 : No energy is generated E8 : Cell division/ mitosis cannot occur E9 : No growth/ production of new cells.	1 1 1 1 1 1 1 1 1 1 1 1	4	**(Any 1F +3E)**
	TOTAL	**12**		

ITEM NO	SCORING CRITERIA	MARKS		REMARKS
2(a)			2	
(b)(i)	Diagram 2.1 : Facilitated diffusion Diagram 2.2 : Active transport	1 1	2	
(ii)	P1 : Amino acid molecules diffuse from higher concentration to lower concentration / follow the concentration gradient (without energy) P2 : Amino acid will bind with the active site of carrier protein P3 : carrier protein changes shape P4 : to allow the molecules to pass through the plasma membrane	1 1 1 1	2	**Any 2**
(c)	F1 : Potassium ion / Sodium ion/ any example of ions E1 : charged molecule E2 : small molecule	1 1 1	2	**(F1+ E1/ E2)**
(d)(i)			2	**Diagram** **- 1 mark** **Label** **- 1 mark**
(ii)	P1 : The salt solution is hypertonic to chilli cell P2 : Water molecules diffuse out from the chilli through osmosis P3 : Vacuole and cytoplasm shrink and the plasma membrane pulls away from the cell wall. P4 : The cell become flaccid / the cell is plasmolysed P5 : This process is called plasmolysis	1 1 1 1 1	2	**Any 2**
	TOTAL	**12**		

ITEM NO	SCORING CRITERIA	MARKS		REMARKS
3(a)(i)	Mitosis	1	1	
(ii)	P1 : Mitosis causes the number of cells to increase (exponentially) P2 : This allow the growth/increase in length of the shoot	1 1	2	
(b)(i)	All clones are (genetically) identical // identical to parents.	1	1	
(ii)	**Advantages:** P1 : Many clones can be produced in large number in a shorter time//Increase quantity of clones faster//Increase the rate of production P2 : The good qualities of the plants can be selected (maintained in the clones) P3 : It ensures the continuity of hereditary traits (from parent to the clones) P4 : It can be carried out at any time of the year	1 1 1 1	2	**Any 2**
	Disadvantages: P1 : Clones do not show any (genetic) variation/ no variation P2 : All clones have the same level of resistance towards certain disease P3 : Clones are not resistant to new diseases/pests P4 : Cloning prevents natural selection P5 : Expensive P6 : More expertise needed	1 1 1 1 1 1	2	**Any 2**
(c)(i)	P1 : the cells are exposed to carcinogenic substances P2 : causes the mutation of the genes that regulate the cell cycle// mutation of the cell cycle occurs P3: (cells) divide through mitosis repeatedly without control/ uncontrolled mitosis occurs	1 1 1	2	**Any 2**
(ii)	P1 : (Radioactive rays will) kill cancer cells P2 : (When all cancer cells are destroyed), they cannot reproduce by mitosis	1 1	2	
	TOTAL	**12**		

ITEM NO	SCORING CRITERIA	MARKS		REMARKS
4(a)(i)	The shoot grows / bends towards light	1	1	
(ii)	Positive phototropism	1	1	
(iii)	P1 : Auxin is transported from the bright side to the shaded side. P2 : Cell on the shaded side of the steam elongate more (from those on the bright side) P3 : Thus, the shoot bends in the direction of light	1 1 1	3	
(b)	 P1 : Auxin will gather at the base of the horizontal root due to gravity P2 : High concentration of auxin retards/ inhibits the elongation of root, P3 : the root grows downwards.	1 1 1 1	3	**Diagram 1 mark** **Any 2P**
(c)		1 1	2	
(d)	F1 : Keep the unripe mangoes together with the ripe ones. E1 : Ripe fruit produce ethylene, ripening fruit can be hastened by aerating them with ethylene. F2 : Put unripe fruits in the close container and spray with ethylene E2 : Ethylene will be trapped and speed up ripening of the fruits.	1 1 1 1	2	**(F1 + E1)** or **(F2 + E2)**
	TOTAL	**12**		

ITEM NO	SCORING CRITERIA	MARKS		REMARKS
5(a)(i)	Razak : I^AI^O Fatimah : I^BI^O	1 1	2	Accept alleles written AO, BO
(ii)	Razak : I^A , I^O Fatimah : I^B , I^O * Both type gametes for Razak and Fatimah correct: 1 mark	1 1	2	
(iii)	I^O I^O	1	1	
(b)	P1 : during meiosis P2 : Father / Razak produced gametes with allele I^O while mother also produced gametes with allele I^O P3 : the gametes fused / fertilised (to produced zygote) P4 : zygote / offspring has genotype I^OI^O, (blood group O)	1 1 1 1	3	**Any 3**
(c)	P1: Razak has antigen A P2: Fatimah has antibody A P3: Antigen A and antibody A is not compatible P4: Agglutination will occur // clamping of blood occur // blood vessel is block	1 1 1 1	3	**Any 2**
(d)	Sickle cell anaemia	1	1	
	TOTAL	**12**		

SECTION B / BAHAGIAN B

ITEM NO	SCORING CRITERIA	MARKS	REMARKS
6 (a)	P1 : A balanced diet is the food that contains correct proportion of nutrients which include carbohydrates, proteins, lipids, vitamins, mineral, water and dietary fibre/roughage// A balanced diet is one which contains the correct proportion of all the different food requirement for the body	1	
	P2 : We need a balanced diet to supply enough energy for daily activities	1	
	A pregnant woman:		
	E1 : (A pregnant woman) has a high rate of metabolism to provide energy for herself and the baby	1	
	E2 : More iron is needed to build haemoglobin / to prevent anaemia	1	
	E3 : More calcium / phosphorus are needed to form strong bones / (teeth for the baby)	1	
	A woman athlete:		
	E4: The diet should include more carbohydrates to supply enough energy / to carry out the vigorous activities (in sports) // More energy is needed to contract the muscles	1	
	E5: More protein is required to build new tissues / to replace dead / damaged tissues	1	
	E6: Calcium / sodium / potassium are needed to strengthened bones // prevent muscular cramp	1	
	An old woman:		
	E7 : (An old woman) has a low rate of metabolism // slow growth	1	
	E8 : The diet should contain more protein / vitamins / minerals to maintain good health	1	
	E9 : More calcium / phosphorus to prevent osteoporosis	1	
	E10: Less carbohydrates / fats because of less active // does not need much energy	1	
	E11: Avoid food that contains a lot of fats / sugar / salt.	1	
	E12: Excess sugar can cause diabetes mellitus // excess salt/fats can cause high blood pressure.	1	Any 1 P+ 9 E
	E13: Eat more vegetables / fresh fruits to replenish water (in the body tissues)	1	

<table>
<tr><th>ITEM NO</th><th>SCORING CRITERIA</th><th>MARKS</th><th>REMARKS</th></tr>
<tr><td>6 (b)(i)</td><td>
<table>
<tr><th>Reaction in X</th><th>Reaction in Y</th></tr>
<tr><td>F1: Light reaction occurs</td><td>Dark reaction occurs</td></tr>
<tr><td>F2: Occurs in granum</td><td>Occurs in stroma</td></tr>
<tr><td>F3: Requires light energy</td><td>Does not require light energy</td></tr>
<tr><td>F4: Photolysis of water molecules occurs</td><td>Reduction of carbon dioxide occurs</td></tr>
<tr><td>F5: Produces oxygen, hydrogen atom and ATP</td><td>Produces glucose</td></tr>
<tr><td>F6: Produces ATP</td><td>Uses ATP</td></tr>
</table>
</td><td>1
1
1
1
1</td><td>Any 4F</td></tr>
<tr><td>6 (b)(ii)</td><td>F1 : Epidermis is transparent
E1 : to allow sunlight to penetrate into the leaf

F2 : Waxy cuticle/waterproof layer
E2 : to prevent loss of water/protect the leaf

F3 : Palisade mesophyll cells are closely arranged (and at right angles to the surface of the leaf)
E3 : to absorb/trap maximum sunlight

F4 : Palisade mesophyll cells contain many chloroplasts
E4 : to absorb/trap maximum sunlight

F5 : Spongy mesophyll cells are loosely arranged/has large air spaces between cells
E5 : to allow diffusion of carbon dioxide and oxygen/allow gaseous exchange

F6 : Lower epidermis layer has stomata
E6 : to allow gaseous exchange

F7 : Veins contain xylem and phloem
E7 : to transport water and minerals
E8 : to transport the products of photosynthesis/dissolved organic products</td><td>1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1</td><td>Any 3F + corresponding E

10</td></tr>
<tr><td></td><td></td><td>TOTAL</td><td>20</td></tr>
</table>

ITEM NO	SCORING CRITERIA	MARKS		REMARKS
7 (a)	P1 : After mensturation, the pituitary gland secretes follicle stimulating hormone (FSH)	1		
	P2 : FSH stimulates the development of follicle in the ovary	1		
	P3 : The developing follicle secretes oestrogen.	1		
	P4 : Oestrogen stimulates the repairing and thickening of endometrium.	1		
	P5 : As the level of oestrogen rises, the endometrium becomes thicker	1		
	P6 : The high level of oestrogen detected by pituitary gland which then secreted luteinising hormone (LH)	1		
	P7 : LH stimulates ovulation	1		
	P8 : and the formation of corpus luteum	1		
	P9 : Corpus luteum secretes progesterone	1		
	P10: Progesterone serves to maintain the thickening of the endometrium	1		
	P11: If fertilisation does not occur, the corpus luteum degenerates and the level of progesterone falls	1		
	P12: Endometrium disintegrates and is shed as menstruation	1		
			10	Any 10
(b)	F1 : Maternal blood pressure is higher than the blood pressure of the foetus	1		
	E1 : (The separation could) protect the fine capillaries of the foetus from being damaged	1		
	F2 : (Due to the influence of the father's gene), the foetal blood group may be different from the maternal group	1		
	E2 : (The separation could) prevent agglutination between the maternal dan foetal blood.	1		
	F3 : The separation permits the exchanges of gases, nutrients and waste products	1		
	E3 : (This barrier can) prevent the action of maternal hormones / other chemical in the mother's blood that could harm the development of the foetus.	1		

(c)	F: The woman is facing menopause	1	1	
	E1: During menopause , she produces less oestrogen and progesterone	1		
	E2: Lack of estrogen can cause the loss of calcium in the bones	1		
	E3: This can lead to osteoporosis	1	3	
	Suggestions :			F + Any 2P and 1S
	S: Drink plenty of water// HRT// Omega 3// take more fibrous food(grain)//	1	1	
	Any suitable answer			
		TOTAL		**20**

ITEM NO	SCORING CRITERIA	MARKS		REMARKS
8 (a)	F: Cause by mutation	1		
	P1: (Mutation) is a spontaneous / random change in the structure of the genes / chromosomes	1		
	P2: cause permanent changes in the genetic composition / genotype	1		
	P3: cause by X-rays / gamma rays / ultra violet rays / carsinogenic substances / asbestos / nitrosamine / benzene / formaldehyde / food preservatives	1		
	P4: (mutation in gametes) can be inherited causing abnormal (development) in the offspring	1		
	P5: Two types of mutation, chromosomal and gene mutation	1		
	P6: occurs in somatic cells / gametes	1		
	<u>Example of disease caused by gene mutation</u>			
	P7: sickle cell anaemia	1	10	1F + 9PS
	P8: caused by abnormal haemoglobin / sickle- shape red blood cell // change in the gene produce haemoglobin	1		
	P9: gene mutation is a change in the structure of genes	1		
	P10: it alters the sequence of the DNA	1		
	P11: cause the change in the sequence of amino acids (in the polypeptide chain) // protein formed is different	1		
	<u>Example of disease caused by chromosomal mutation</u>			
	P12: Down Syndrome	1		
	P13: cause by an extra chromosome 21 // 47 chromosomes	1		
	P14: is a change in the structure / number of chromosomes	1		
	P15: (change in the structure of chromosome)includes deletion / inversion / duplication / translocation	1		
	P16: (change in the number of chromosome) through loss / addition (one or more) chromosome	1		
(b)	P1: Resistance towards disease / pest resistant increase,	1		
	P2: because it alter the genetic information in plants	1		
	P3: The quality of agricultural product increases,	1		
	P4: because the quantity of crops/yield increase	1		
	P5: because food/fruit/crop yield can be harvested shortly after planting/ in shorter time/ shorten maturity period	1	4	
	P6: Food/fruit/crop yield supply is sufficient / more food can supply to the people/	1		Any 4

ITEM NO	SCORING CRITERIA	MARKS		REMARKS
(c)	P1:Type of variation: Discontinuous variation P2: cause by crossing over (between non-sister chromatids) P3: occurs during Prophase I of meiosis // segment of chromatid exchange places // produced on these chromatid P4: independent assortment of chromosome P5: during metaphase I of meiosis, the homologous pairs of chromosomes are arranged on the equatorial plate (at random) P6: this results in a variety of gametes, (each with different combinations of maternal and paternal chromosomes). P7: random fertilization // new combination of genes	1 1 1 1 1 1 1	6	Any 6
	TOTAL	**20**		

ITEM NO	SCORING CRITERIA	MARKS		REMARKS
9 (a)	P1: The food chain shows the flow of energy from one trophic level to another P2: The paddy plant / producer received (the highest) energy from sun P3: The light energy is converted to chemical energy/food P4: Through photosynthesis P5: (When) rat eats/consumes paddy plant, energy is transferred to rats P6: 10% energy is transfered from plant to rats // 90% of energy loss P7: (90% of) energy is lost as respiration/reproduction/activity/any suitable process P8: 10% of energy in rat /first consumer is transferred to snake /secondary consume consumer when the snake consumes / eat the rat P9: 10% of energy is transferred to eagle when the eagle consumes the snake. P10: The eagle/third consumer obtain the lowest energy in the food chain.	1 1 1 1 1 1 1 1 1 1 1	5	Max 5
(b)	P1 : Owl and rat show prey-predator interaction P2 : Owl is the predator and rat is the prey P3: When the population of rat / prey / pests increases, the population of the owl / predator also increase P4: The rat eaten / fed by the owl, the population of rat decreases P5: production of crop / paddy increases P6: the interaction can be used as Biological Control Method P7: environmental friendly / No harmful substances / pesticides / Chemical released P8: No pollution P9: Maintain the biodiversity P10: (Prey-predator relationship help to) control the population of pests in the ecosystem / paddy field	1 1 1 1 1 1 1 1 1 1	5	Max 5

(c)	P1: Green house effects P2: Causes heat trapped on the surface of the earth P3: leads to global warming P4: long lasting drought causes water to decrease P5: Water pollution / Garbage dumping into rivers P6: Causes reduced water quality P7: Contaminated water cannot / less be drained into water treatment plants P8: Size of human population increases P9: Increased use of water P11: Increase usage in industrial sector P11: Deforestation / logging P12: reduce water catchment area P13: Causes less rainfall P14: Not / less water is absorbed into the soil P15: Source of clean water in the land is reduced How to overcome O1: water ration / conserve water O2: Provide formal education at schools about the importance of water O3: Enforce legislation to avoid water pollution / deforestation O4: Maintaining rain / water catchment area	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	10	**9 P + 1 O**
		TOTAL		**20**
				REMARKS