

SKEMA K2 BIOLOGI PDA PPC SBP 2024 (VERSI PENATARAN)

SOALAN 1

No.	Skema markah <i>Answer scheme</i>	Sub Mark	Total Mark
1 (a)(i)	Dapat menamakan komponen P dan struktur Q. <i>Able to name component P and structure Q.</i> Contoh jawapan: <i>Sample answer:</i> P: Nukleus <i>Nucleus</i> Q: Kromosom/kromatin <i>Chromosome/chromatin</i>	1 1	2
(a)(ii)	Dapat menyatakan fungsi komponen P. <i>Able to state the function of component P.</i> Contoh Jawapan: <i>Sample Answers:</i> P1: Mengawal segala aktiviti sel <i>Control all cell activities</i> P2: Mengandungi DNA / maklumat genetik <i>Contain 88/ genetic information</i> Mana-mana satu <i>Any one</i>	1 1	1
(b) (i)	Dapat menamakan jenis asid nukleik <i>Able to name the type of nucleic acid</i> Contoh Jawapan: <i>Sample Answers:</i> Asid deoksiribonukleik / DNA <i>Deoxyribonucleic acid / DNA</i>	1	1
(b)(ii)	Dapat menerangkan kesan terhadap ciri organisma sekiranya berlaku perubahan pada susunan bes bernitrogen.		2

No.	Skema markah <i>Answer scheme</i>	Sub Mark	Total Mark
(a)(i)	Dapat menamakan struktur X dan Y. <i>Able to name structure X and Y.</i> Contoh jawapan: <i>Sample answer:</i> X : Stroma Y : Tilakoid / <i>Thylakoid</i>	 1 1	2
(a)(ii)	Dapat menyatakan kepentingan struktur X. <i>Able to state the importance of structure X.</i> Contoh jawapan:		1

	<i>Sample answer:</i> Tapak berlaku tindak balas tidak bersandarkan cahaya / glukosa dihasilkan/ penurunan karbon dioksida <i>Site for light-independent reaction / glucose production/ reduction of carbon dioxide</i>	1	
(b)	Dapat menerangkan faktor suhu dapat meningkatkan kadar fotosintesis tumbuhan <i>Able to describe factors temperature can increase the rate of photosynthesis in plant</i> Contoh jawapan: <i>Sample answer:</i> P1 : Kadar fotosintesis meningkat / lebih tinggi/ maksimum <i>Rate of photosynthesis increase/ higher/maximum</i> P2: Meningkatkan tenaga kinetik / aktiviti enzim <i>Increase the kinetic energy / activity of enzyme</i> P3: Fotolisis air / penurunan karbon dioksida meningkat <i>Photolysis of water / reduction of carbon dioxide increases</i> Mana-mana dua P <i>Any two P</i>	1 1 1	2
(c)	Dapat menyatakan perubahan yang berlaku. <i>Able to state the changes.</i> Contoh jawapan: <i>Sample answer:</i> P1 : Keamatan cahaya (semasa musim luruh) lebih rendah (berbanding musim panas) <i>Light intensity (during autumn) is lower (than during summer)</i> P2: Tumbuhan berhenti menghasilkan klorofil // menyebabkan klorofil terurai <i>Plant stops making chlorophyll // cause chlorophyll to break down</i> Mana-mana satu P <i>Any one P</i>	1 1	1
Jumlah			6

SOALAN 3

No.	Skema markah <i>Answer scheme</i>	Sub Mar k	Total Mar k
(a)(i)	Dapat menamakan jenis bagi mikroorganisma berikut <i>Able to name the type of the following microorganisms</i> Contoh jawapan: <i>Sample answer:</i> X : Bakteria <i>Bacteria</i> <i>*reject : Eubacteria</i> Y : Kulat/Fungi <i>Fungi</i>	1 1	2
(a)(ii)	Dapat menamakan penyakit dan simptom yang disebabkan oleh mikroorganisma ini <i>Able to name the disease and symptoms caused by this microorganism.</i> Contoh Jawapan: <i>Sample Answers:</i> Penyakit : Kolera/ Taun <i>Disease : Cholera</i> Simptom : Cirit birit / muntah / dehidrasi <i>Symptoms : Diarrhoea / vomiting / dehydration</i>	1 1	2
(a)(iii)	Dapat menyatakan peranan mikroorganisma Y <i>Able to state the role of microorganism Y</i> Contoh Jawapan: <i>Sample Answers:</i> P1: Menjalankan fermentasi alkohol <i>Undergo alcohol fermentation</i> P2: Pemecahan molekul glukosa tidak lengkap <i>The incomplete breakdown of glucose</i> P3 : Menghasilkan (etanol), karbon dioksida (dan tenaga) <i>to produce (ethanol), carbon dioxide (and energy)</i> P4: Karbon dioksida terperangkap// menaikkan / menggebukan <u>doh</u> <i>Trapped carbon dioxide //rises/ fluffy the dough</i>	1 1 1 1	1

	Sekurang-kurangnya satu P <i>At least one P</i>		
(b)	Boleh menerangkan bagaimana individu ini boleh dijangkiti oleh penyakit tersebut. <i>Able to explain how this individual been infected by the disease.</i> Contoh Jawapan: <i>Sample Answers:</i> P1: Air paip merupakan habitat bagi protozoa tersebut <i>Tap water is the habitat of the protozoa</i> P2: Protozoa ialah mikroorganisma akuatik <i>The protozoa is an aquatic microorganism</i> P3: Larutan tersebut merupakan larutan steril// boleh memusnahkan protozoa <i>The solution is sterile solution// can destroy protozoa</i> P4: Tiada mikroorganisma (dalam larutan steril) <i>No microorganism (in the sterile solution)</i> Sekurang-kurangnya dua P <i>At least two P</i>	1 1 1 1	2
JUMLAH			7

SOALAN 4

No.	Skema markah <i>Answer scheme</i>	Sub Mark	Total Mark
(a)(i)	Dapat mengenal pasti proses K dan gas X. <i>Able to identify process K and gas X.</i> Contoh jawapan: <i>Sample answer:</i> Proses K/ <i>Process K</i> Glikolisis/ <i>Glycolysis</i> Gas X/ <i>Gas X</i> Oksigen/ <i>Oxygen</i>	1 1	2
(a)(ii)	Dapat menyatakan kelebihan proses respirasi yang ditunjukkan pada Rajah 4.1 pada sel otot manusia. <i>Able to state the advantages of the respiration process shown in Diagram 4.1 in human muscle cell.</i> Contoh Jawapan:		1

	<i>Sample Answers:</i> P1: Tenaga yang dihasilkan (lebih) banyak/ 2898 kJ/ 38 ATP. <i>More energy/ 2898 kJ/ 38 ATP is produced.</i> P2: Pengoksidaan /penguraian glukosa berlaku dengan lengkap. <i>Glucose oxidation /breakdown occurs completely.</i> P3: Tiada penghasilan asid laktik (yang menyebabkan kesakitan otot) // Tidak menyebabkan sakit/kejang otot <i>No production of lactic acid (which causes muscle pain)</i> <i>// No muscle pain/cramp</i> Mana-mana satu <i>Any one</i>	1	
(b) (i)	Boleh menyatakan perbezaan kandungan alkohol proses yang berlaku sebelum hari ke 4 berbanding selepas hari ke 4 eksperimen dilakukan. <i>Able to state the difference in alcohol content before day 4 and after day 4 of the experiment.</i> Contoh Jawapan: <i>Sample Answers:</i> P1: Sebelum hari ke 4, yis menjalankan respirasi aerob manakala selepas hari ke 4, yis menjalankan fermentasi alkohol <i>Before day 4, yeast undergo aerobic respiration, while after day 4, yeast undergo alcohol fermentation</i> P2: Sebelum hari ke 4, pengoksidaan /penguraian glukosa lengkap manakala selepas hari ke 4, pengoksidaan /penguraian glukosa tidak lengkap <i>Before day 4, complete oxidation /breakdown of glucose, while after day 4, incomplete oxidation /breakdown of glucose</i> P3: Sebelum hari ke 4, bekalan oksigen ada/ mencukupi manakala selepas hari ke 4, bekalan oksigen tiada/ tidak mencukupi <i>Before day 4, presence/ sufficient of oxygen supply, while after day 4, no/ insufficient oxygen supply</i>	1	1

	P4: Sebelum hari ke 4, tiada alkohol terhasil / isipadu alkohol sifar <u>manakala</u> selepas hari ke 4, alkohol terhasil / isipadu alkohol meningkat <i>Before day 4, no alcohol produced /volume of alcohol is zero, while after day 4, alcohol produced /volume of alcohol increases</i> Reject: Isipadu alkohol lebih rendah (utk sebelum hari ke-4) <i>Volume of alcohol is lower (for before day-4)</i> P5: Sebelum hari ke 4, penghasilan tenaga/ATP adalah lebih tinggi manakala selepas hari ke 4, penghasilan tenaga/ATP adalah lebih tinggi <i>Before day 4, energy/ATP production is high while after day 4, energy/ATP production is low</i> *Nota: Terima jawapan dalam bentuk jadual. Sekiranya jawapan dalam bentuk ayat pastikan ada kata hubung cthnya manakala, tetapi dll. Mana-mana satu P <i>Any one P</i>		
(b)(ii)	Dapat menerangkan kesan terhadap isipadu alkohol. <i>Able explain the effect on the volume of alcohol.</i> Contoh Jawapan: <i>Sample Answers:</i> P1: Tiada alkohol terhasil / isipadu alkohol sifar <i>No alcohol produced /volume of alcohol is zero</i> P2: Fermentasi alkohol tidak berlaku <i>Alcohol fermentation does not occur</i> P3: Yis menjalankan proses respirasi aerob <i>Yeast undergoes aerobic respiration</i> P4: Bekalan oksigen ada /mencukupi <i>Oxygen supply is present/sufficient</i> P5: Pengoksidaan /penguraian glukosa berlaku dengan lengkap. <i>Glucose oxidation /breakdown occurs completely.</i> Mana-mana 3P <i>Any three Ps</i>	1 1 1 1 1	3
Jumlah			7

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	P1: Pada titik M / suhu optimum, enzim adalah paling aktif <i>At point M / optimum temperature, the enzyme is most active</i> P2: <u>Frekuensi perlanggaran berkesan</u> adalah maksimum <i>The frequency of effective collisions is maximum</i> P3: Pada titik N / suhu tinggi, enzim ternyahasli / tapak aktif enzim berubah// ikatan kimia (dalam enzim) terputus <i>At point N / high temperature, the enzyme is denatured / the active site of the enzyme changes// chemical bond (in the enzyme) breaks</i> F dan Mana-mana 2P <i>F with Any 2P</i>	1 1	
(c)	Dapat menerangkan, menggunakan contoh enzim tersekat gerak yang sesuai dalam penghasilan agar. <i>Able to explain, using a suitable example of immobilized enzyme, in the production of agar.</i> Contoh Jawapan: <i>Sample Answers:</i> P1: Enzim yang digunakan ialah selulase <i>The enzyme used is cellulase</i> P2: Selulase / enzim bergabung dengan bahan lengai/tidak larut <i>cellulase / enzyme combines with inert/ insoluble substance</i> P3: untuk meningkatkan rintangan (selulase) terhadap perubahan pH/suhu <i>to increase the resistance (of cellulase) towards change in pH/temperature</i> P4: Selulase / enzim kekal di kedudukan yang sama// Selulase / enzim mudah diasingkan daripada produk/ agar <i>Cellulase/ enzyme can be remained in the same position// Cellulase/ enzyme can be separated easily from the product/ agar</i> P5: (enzim selulase) menguraikan <u>lebih banyak</u> selulosa (dalam rumpai laut) kepada glukosa <i>(cellulase enzyme) breaks down more cellulose (in seaweed) to glucose</i> Mana-mana 3P <i>Any 3P</i>	1 1 1 1 1	3
JUMLAH			8

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SOALAN 6

No.	Skema markah <i>Answer scheme</i>	Sub Mark	Total Mark
(a)(i)	Dapat menyatakan enzim yang terdapat dalam R <i>Able to state the enzyme found in R</i> Contoh jawapan: <i>Sample answer:</i> Pepsin/ Pepsinogen <i>Pepsin /Pepsinogen</i>	1	1
(a)(ii)	Dapat menyatakan kelas makanan yang dihidrolisiskan oleh enzim di (a)(i). <i>Able to explain the food class that hydrolysed by the enzyme in (a)(i)</i> Contoh Jawapan: <i>Sample Answers:</i> P1: Protein <i>Proteins</i>	1	1
(b)	Dapat menerangkan kesan kepada proses penyerapan yang berlaku di organ Q apabila sedikit organ Q dipotong dan dibuang. <i>Able to the effect to absorption process in organ Q when small part of organ Q must be cut and removed</i> Contoh Jawapan: <i>Sample Answers:</i> P4: Kurang nutrien/glukosa/asid amino/asid lemak/gliserol/ vitamin diserap <i>Less nutrient/glucose/amino acid/fatty acid/glycerol will be absorbed</i> P1: Ileum menjadi pendek//Bilangan vilus berkurang <i>Ileum become short//Number of villus become less</i> P2: Mengurangkan jumlah luas permukaan (untuk penyerapan) <i>Decrease total surface area (for absorption)</i> P3: Jumlah kapilari darah/ lakteal (dalam vilus) akan berkurangan <i>Less numbers of blood capillary/lacteal (in villus)</i>	1 1 1 1	3

	Mana-mana tiga Any three																				
(c)	Dapat membezakan pencernaan yang berlaku di dalam P dan R <i>Able to differentiate digestion that take place in P and R</i> Contoh Jawapan: <i>Sample Answers:</i> PERBEZAAN/ <i>DIFFERENCES:</i> <table><tr><td></td><td>P/ Duodenum <i>P/ Duodenum</i></td><td>R/Perut <i>R/ stomach</i></td></tr><tr><td>P1:</td><td>Jus pankreas dirembeskan oleh pankreas <i>Pancreatic juice secreted by the pancreas</i></td><td>Jus gastrik yang dirembeskan oleh kelenjar gastrik. <i>Gastric juice secreted by gastric glands.</i></td></tr><tr><td>P2:</td><td>Berlaku pencernaan kanji/ lipid/ polipeptida <i>Digestion of starch/ lipid/ polypeptide</i></td><td>Berlaku pencernaan protein <i>Digestion of protein takes place</i></td></tr><tr><td>P3:</td><td>Terdapat enzim amilase pankreas/ tripsin/ lipase <i>Has pancreatic amylase/ tripsin/ lipase</i></td><td>Terdapat enzim pepsin/ pepsinogen <i>Has pepsin/pepsinogen enzyme</i></td></tr><tr><td>P4:</td><td>Tindakan enzim dalam medium beralkali <i>The action of enzyme in alkaline medium</i></td><td>Tindakan enzim dalam medium berasid <i>The action of enzyme in acidic medium</i></td></tr><tr><td>P5:</td><td>Hasil pencernaan adalah maltosa/ asid lemak/ gliserol/ dipeptida <i>Product of digestion is maltose/fatty acid/ glycerol/dipeptide</i></td><td>Hasil pencernaan adalah polipeptida <i>Product of digestion is polypeptide</i></td></tr></table> Mana-mana tiga Any three		P/ Duodenum <i>P/ Duodenum</i>	R/Perut <i>R/ stomach</i>	P1:	Jus pankreas dirembeskan oleh pankreas <i>Pancreatic juice secreted by the pancreas</i>	Jus gastrik yang dirembeskan oleh kelenjar gastrik. <i>Gastric juice secreted by gastric glands.</i>	P2:	Berlaku pencernaan kanji/ lipid/ polipeptida <i>Digestion of starch/ lipid/ polypeptide</i>	Berlaku pencernaan protein <i>Digestion of protein takes place</i>	P3:	Terdapat enzim amilase pankreas/ tripsin/ lipase <i>Has pancreatic amylase/ tripsin/ lipase</i>	Terdapat enzim pepsin/ pepsinogen <i>Has pepsin/pepsinogen enzyme</i>	P4:	Tindakan enzim dalam medium beralkali <i>The action of enzyme in alkaline medium</i>	Tindakan enzim dalam medium berasid <i>The action of enzyme in acidic medium</i>	P5:	Hasil pencernaan adalah maltosa/ asid lemak/ gliserol/ dipeptida <i>Product of digestion is maltose/fatty acid/ glycerol/dipeptide</i>	Hasil pencernaan adalah polipeptida <i>Product of digestion is polypeptide</i>	1 1 1 1 1	3
	P/ Duodenum <i>P/ Duodenum</i>	R/Perut <i>R/ stomach</i>																			
P1:	Jus pankreas dirembeskan oleh pankreas <i>Pancreatic juice secreted by the pancreas</i>	Jus gastrik yang dirembeskan oleh kelenjar gastrik. <i>Gastric juice secreted by gastric glands.</i>																			
P2:	Berlaku pencernaan kanji/ lipid/ polipeptida <i>Digestion of starch/ lipid/ polypeptide</i>	Berlaku pencernaan protein <i>Digestion of protein takes place</i>																			
P3:	Terdapat enzim amilase pankreas/ tripsin/ lipase <i>Has pancreatic amylase/ tripsin/ lipase</i>	Terdapat enzim pepsin/ pepsinogen <i>Has pepsin/pepsinogen enzyme</i>																			
P4:	Tindakan enzim dalam medium beralkali <i>The action of enzyme in alkaline medium</i>	Tindakan enzim dalam medium berasid <i>The action of enzyme in acidic medium</i>																			
P5:	Hasil pencernaan adalah maltosa/ asid lemak/ gliserol/ dipeptida <i>Product of digestion is maltose/fatty acid/ glycerol/dipeptide</i>	Hasil pencernaan adalah polipeptida <i>Product of digestion is polypeptide</i>																			

JUMLAH	8
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SOALAN 7

No.	Skema markah <i>Answer scheme</i>	Sub Mark	Total Mark
(a)(i)	Dapat menamakan sel P. <i>Able to name cell P.</i> Contoh jawapan: <i>Sample answer:</i> P: Spermatoosit sekunder <i>Secondary spermatocyte</i>	1	1
(a)(ii)	Dapat menyatakan bilangan kromosom dalam sel P <i>Able to state the number of chromosome in the cell P.</i> Contoh Jawapan: <i>Sample Answers:</i> 23/Haploid/n = 23	1	1
(b)	Dapat menerangkan kesan kepada kualiti sperma yang dihasilkan jika proses Q tidak berlaku. <i>Able to explain the effect on the quality of sperm produced if process Q does not occur.</i> Contoh Jawapan: <i>Sample Answers:</i> P1: Kualiti sperma menurun/merosot <i>Quality of sperms decreases/degrade</i> P2: (jika Q tidak berlaku), sperma tidak mempunyai bahagian tengah / ekor / cacat <i>(if Q does not occur), sperm do not have a midpiece / tail/ abnormal</i> P3: Kurang mitokondria <i>Less mitochondria</i> P4: sperma tidak mempunyai tenaga yang banyak untuk berenang / tidak boleh berenang ke tiub Falopio	1 1 1 1	3

	<i>sperm do not have much energy to swim / cannot swim to the Fallopian tubes</i> Mana-mana tiga <i>Any three</i>											
(c) (i)	Dapat menyatakan dua perbezaan di antara perlakuan kromosom dalam Rajah 7.2 dengan perlakuan kromosom semasa anafasa. <i>Able to state two differences between the behavior of chromosomes in Diagram 7.2 and the behavior of chromosomes during anaphase.</i> Contoh Jawapan: <i>Sample Answers:</i> <table><tr><td></td><td>Rajah 7.2 <i>Diagram 7.2</i></td><td>Anafasa <i>Anaphase</i></td></tr><tr><td>P1:</td><td>Kromosom homolog berpisah <i>Homologous chromosomes separated</i></td><td><u>Kromatid kembar</u> / kromosom berpisah <i>Sister chromatids / chromosome separated</i></td></tr><tr><td>P2:</td><td>Kromosom homolog tertarik/bergerak ke kutub bertentangan <i>Homologous chromosomes are attracted/move/pull to opposite poles</i></td><td><u>Kromatid kembar</u> / kromosom tertarik/bergerak ke kutub bertentangan <i>Sister chromatids / chromosome are attracted/move/pull to opposite poles</i></td></tr></table>		Rajah 7.2 <i>Diagram 7.2</i>	Anafasa <i>Anaphase</i>	P1:	Kromosom homolog berpisah <i>Homologous chromosomes separated</i>	<u>Kromatid kembar</u> / kromosom berpisah <i>Sister chromatids / chromosome separated</i>	P2:	Kromosom homolog tertarik/bergerak ke kutub bertentangan <i>Homologous chromosomes are attracted/move/pull to opposite poles</i>	<u>Kromatid kembar</u> / kromosom tertarik/bergerak ke kutub bertentangan <i>Sister chromatids / chromosome are attracted/move/pull to opposite poles</i>	1 1	2
	Rajah 7.2 <i>Diagram 7.2</i>	Anafasa <i>Anaphase</i>										
P1:	Kromosom homolog berpisah <i>Homologous chromosomes separated</i>	<u>Kromatid kembar</u> / kromosom berpisah <i>Sister chromatids / chromosome separated</i>										
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(c) (ii)	Dapat menerangkan bagaimana keadaan tak disjungsi yang berlaku semasa meiosis boleh mengakibatkan bilangan kromosom gamet tidak normal. <i>Able to explain how non-disjunction that occurs during meiosis can result in abnormal number of chromosomes in gamete.</i> Contoh Jawapan: <i>Sample Answers:</i> P1: Kromosom homolog / kromatid kembar gagal berpisah / ditarik ke kutub bertentangan <i>Homologous chromosomes / sister chromatids fail to separate / pull to opposite poles</i> P2: Semasa anafasa I/ II <i>During anaphase I/II</i> P3: Kerana gentian gelendong gagal berfungsi / terbentuk <i>Because the spindle fibers fail to function / form</i>	1 1 1	2									

	P4: Menyebabkan bilangan kromosom dalam sel gamet kurang/lebih <i>Causes the number of chromosomes in gamete cells less/more</i> P2 mesti sepadan dengan P1 <i>P2 has to correspond to P1</i> Mana-mana 2P <i>Any 2P</i>	1	
JUMLAH			9

SOALAN 8

No.	Skema markah Answer scheme	Sub Mark	Total Mark						
(a)(i)	Dapat menyatakan fungsi salur darah X. <i>Able to state the function of blood vessel X.</i> Contoh jawapan: <i>Sample answer:</i> P1: Untuk membekalkan oksigen/ glukosa (kepada tisu jantung) // mengangkut darah beroksigen (ke tisu jantung) <i>To supply oxygen/ glucose (to the tissue of heart) // transport oxygenated blood (to the tissue of heart)</i>	1	1						
(a)(ii)	Dapat menerangkan bagaimana HDL yang direka dapat merawat masalah enapan kolesterol pada salur X. <i>Able to explain how the HDL created can treat the problem of cholesterol deposition in vessel X.</i> Contoh Jawapan: <i>Sample Answers:</i> <table><tr><td>P1:</td><td>HDL mengurangkan/ menyingkirkan/ angkut enapan kolesterol/ plak pada dinding (dalam) arteri <i>HDL reduce/remove/ transport deposition of cholesterol/ plaque at the (inner) wall of artery</i></td></tr><tr><td>P2:</td><td>Saiz lumen kembali normal// lumen kurang tersumbat <i>Lumen size return to normal// lumen less blocked</i></td></tr><tr><td>P3:</td><td>Pengaliran darah menjadi lancar// Tekanan darah kembali normal <i>Blood flow smoothly// Blood pressure return to normal</i></td></tr></table>	P1:	HDL mengurangkan/ menyingkirkan/ angkut enapan kolesterol/ plak pada dinding (dalam) arteri <i>HDL reduce/remove/ transport deposition of cholesterol/ plaque at the (inner) wall of artery</i>	P2:	Saiz lumen kembali normal// lumen kurang tersumbat <i>Lumen size return to normal// lumen less blocked</i>	P3:	Pengaliran darah menjadi lancar// Tekanan darah kembali normal <i>Blood flow smoothly// Blood pressure return to normal</i>	1 1 1	2
P1:	HDL mengurangkan/ menyingkirkan/ angkut enapan kolesterol/ plak pada dinding (dalam) arteri <i>HDL reduce/remove/ transport deposition of cholesterol/ plaque at the (inner) wall of artery</i>								
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P3:	Pengaliran darah menjadi lancar// Tekanan darah kembali normal <i>Blood flow smoothly// Blood pressure return to normal</i>								

	Mana-mana dua Any two		
(a)(iii)	Dapat mencadangkan satu cara dan menerangkan bagaimana cara tersebut dapat mengatasi 90% penyumbatan kolesterol pada salur X. <i>Able to suggest a method and explain how the method can overcome the problem of 90% of cholesterol deposition in blood vessel X.</i> Contoh Jawapan: Sample Answers: F1: Angioplasti (arteri koronari/ kardiak) // Menggunakan stent/ belon// kateter <i>(Cardiac/ coronary artery) angioplasty// Using stent/ balloon/ catheter</i> P1: Menambahkan saiz lumen (arteri X)// membesarkan bukaan salur darah <i>Inceases the size of lumen (of artery X)// enlarge the opening of artery X</i> F2: Pintasan koronari arteri <i>Coronary artery bypass</i> P2: Membuat laluan baru untuk pengaliran darah ke jantung <i>Created a new pathway flow of blood to the heart</i> F3: Pemindahan jantung <i>Heart transplant</i> P3: Menggantikan dengan jantung yang sihat <i>Replaced with a healthy heart</i> Mana-mana satu F dan P yang sepadan Any one F with corresponding P	1 	



	(Hand) become swollen// suffering oedema								
	P2: (Disebabkan salur limfa di tangan tersumbat), bendalir tisu tidak dapat mengalir ke dalam salur limfa (dari ruang antara sel) <i>(Due to clogged at the lymphatic vessels of hand), tissue fluid cannot flow into the lymphatic vessels of hand (from the space of the cell)</i>	1							
	P3: Disebabkan oleh pengumpulan bendalir tisu (yang berlebihan) di ruang antara sel <i>Due to (excessive) accumulation of tissue fluid in the space between the cell</i>	1							
	P4: Menghadkan pembengkokan/pelurusan tangan // menghadkan pergerakan pada tangan <i>Limited the bending/straightening of arm// limited the movement of arm</i>	1							
	P5: Kurang bendalir limfa terbentuk// kurang bendalir tisu/limfa di hantar/ dikembalikan ke sistem peredaran darah/jantung <i>Less lymph is produced// less tissue fluid/ lymph is send/return back into the blood circulatory system/heart</i>	1							
	Mana-mana dua Any two								
(ii)	Perbezaan/ Differences: Dapat membezakan antara sistem peredaran darah dan sistem Y berdasarkan komposisi bahannya dan fungsinya. <i>Able to differentiate between the blood circulatory system and system Y based on their composition and function.</i> Contoh Jawapan: Sample Answers: <table><tr><td>Aspek Aspect</td><td>Sistem peredaran darah Blood circulatory system</td><td>Sistem Y System Y</td></tr><tr><td>Komposisi Composition</td><td>Kurang lipid/ karbon dioksida// Lebih banyak asid amino/oksigen/glukosa</td><td>Lebih banyak lipid / karbon dioksida // Kurang asid amino/oksigen/ glukosa</td></tr></table>	Aspek Aspect	Sistem peredaran darah Blood circulatory system	Sistem Y System Y	Komposisi Composition	Kurang lipid/ karbon dioksida// Lebih banyak asid amino/oksigen/glukosa	Lebih banyak lipid / karbon dioksida // Kurang asid amino/oksigen/ glukosa	1	2
Aspek Aspect	Sistem peredaran darah Blood circulatory system	Sistem Y System Y							
Komposisi Composition	Kurang lipid/ karbon dioksida// Lebih banyak asid amino/oksigen/glukosa	Lebih banyak lipid / karbon dioksida // Kurang asid amino/oksigen/ glukosa							

		<i>Less lipid/ carbon dioxide// More amino acids/ oxygen/ glucose</i>	<i>More lipid/ amino acids/ carbon dioxide// Less amino acids/ oxygen/ glucose</i>		1	
	Komposisi <i>Composition</i>	Mengandung sel darah merah/ protein plasma/ fibrinogen/ albumin/ globulin/ platlet <i>Contain red blood cell/ plasma protein/ fibrinogen/ albumen/ globulin/ platlet</i>	Tidak mengandung sel darah merah/ protein plasma/ fibrinogen/ albumin/ globulin/ platlet <i>Does not contain red blood cell/ plasma protein/ fibrinogen/ albumen/ globulin/ platlet</i>		1	
	Kepentingan <i>Importance</i>	Mengangkut darah dari jantung ke seluruh sel-sel badan/dari sel-sel badan kembali ke jantung Membekalkan/ mengangkut nutrien/ glukosa/ oksigen ke sel-sel badan // Menyingkirkan/ mengangkut bahan kumuh/ karbon dioksida/ urea dari sel-sel badan <i>Transport blood from heart to all part of body cells/ return the blood from all part of body cells to the heart// Supply/ transport nutrient/ glucose/ oxygen to the body cells// Eliminates/ transport waste products/ carbon dioxide/ urea from the body cells/</i>	Menghasilkan limfosit untuk pertahanan badan// mengangkut titisan lemak/vitamin larut lemak ke peredaran darah// mengembalikan bendalir tisu berlebihan ke dalam aliran darah untuk mengekalkan tekanan darah/ isipadu darah <i>Produces lymphocytes for body defence// transports lipid droplets/lipid soluble vitamins into the bloodstream// Returning excess interstitial fluid into blood stream to maintain blood pressure/ blood volume</i>			

	Mana-mana satu komposisi+kepentingan <i>Any one from composition+importance</i>		
JUMLAH			9

SOALAN 9

No.	Skema markah Answer scheme	Sub Mark	Total Mark								
(a)(i)	Dapat menamakan hormon T dan tisu sasaran di mana hormon T bertindak. <i>Able to name hormone T and target tissue where hormone T act upon</i> Jawapan: <i>Answer:</i> T adalah ADH / Antidiuretik hormon <i>T is ADH / Antidiuretic hormone</i> Tisu sasaran : Tubul berlingkar distal/ pengumpul/ tisu nefron <i>Target tissues : Distal convoluted tubule / collecting duct / nephron tissues</i>	1 1	2								
(a)(ii)	Dapat membanding bezakan peranan kelenjar S dalam mengawalatur kandungan air bagi individu X dan individu Y. <i>Able to compare and contrast the role of gland S in regulating water content of individual X and individual Y.</i> Contoh Jawapan: <i>Sample Answers:</i> Persamaan / <i>Similarities:</i> <table><tr><td>P1</td><td>Kedua-duanya melibatkan kelenjar pituitari/S <i>Both involve pituitary gland/S</i></td></tr><tr><td>P2</td><td>Kedua-duanya melibatkan hormon ADH/ hormon T <i>Both involve ADH hormone/ hormone T</i></td></tr><tr><td>P3</td><td>Kedua-duanya melibatkan mekanisme suap balik negatif <i>Both involve negative feedback mechanism</i></td></tr><tr><td>P4</td><td>Kedua-duanya mengembalikan tekanan osmosis darah ke julat normal</td></tr></table>	P1	Kedua-duanya melibatkan kelenjar pituitari/S <i>Both involve pituitary gland/S</i>	P2	Kedua-duanya melibatkan hormon ADH/ hormon T <i>Both involve ADH hormone/ hormone T</i>	P3	Kedua-duanya melibatkan mekanisme suap balik negatif <i>Both involve negative feedback mechanism</i>	P4	Kedua-duanya mengembalikan tekanan osmosis darah ke julat normal	1 1 1 1	6
P1	Kedua-duanya melibatkan kelenjar pituitari/S <i>Both involve pituitary gland/S</i>										
P2	Kedua-duanya melibatkan hormon ADH/ hormon T <i>Both involve ADH hormone/ hormone T</i>										
P3	Kedua-duanya melibatkan mekanisme suap balik negatif <i>Both involve negative feedback mechanism</i>										
P4	Kedua-duanya mengembalikan tekanan osmosis darah ke julat normal										

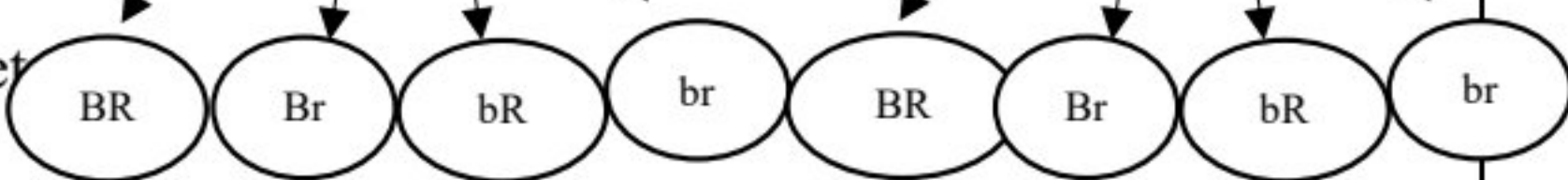
	<i>Both return blood osmotic pressure to normal range</i>																			
P5	Kedua-duanya mempengaruhi ketelapan dinding tubul berlingkar distal/duktus pengumpul <i>Both affect the permeability of the walls of distal convoluted tubule/collecting duct</i>	1																		
Perbezaan / Differences:																				
	<table><tr><td></td><td>Individual X <i>Individual X</i></td><td>Individual Y <i>Individual Y</i></td></tr><tr><td>P6</td><td>Kelenjar pituitari kurang dirangsang <i>Pituitary gland is less stimulated</i></td><td>Kelenjar pituitari dirangsang <i>Pituitary gland is stimulated</i></td></tr><tr><td>P7</td><td>Kurang ADH dirembes <i>Less ADH secreted</i></td><td>Lebih ADH dirembes <i>More ADH secreted</i></td></tr><tr><td>P8</td><td>Dinding tubul berlingkar distal/duktus pengumpul kurang telap terhadap air <i>Wall of distal convoluted tubule/collecting duct less permeable to water</i></td><td>Dinding tubul berlingkar distal/duktus pengumpul lebih telap terhadap air <i>Wall of distal convoluted tubule/collecting duct more permeable to water</i></td></tr><tr><td>P9</td><td>Kurang air diserap semula ke dalam kapilari darah <i>Less water reabsorbed into blood capillary</i></td><td>Lebih air diserap semula ke dalam kapilari darah <i>More water reabsorbed into blood capillary</i></td></tr><tr><td>P10</td><td>Menghasilkan kencing yang cair <i>Produce dilute urine</i></td><td>Menghasilkan kencing yang pekat <i>Produce concentrated urine</i></td></tr></table>		Individual X <i>Individual X</i>	Individual Y <i>Individual Y</i>	P6	Kelenjar pituitari kurang dirangsang <i>Pituitary gland is less stimulated</i>	Kelenjar pituitari dirangsang <i>Pituitary gland is stimulated</i>	P7	Kurang ADH dirembes <i>Less ADH secreted</i>	Lebih ADH dirembes <i>More ADH secreted</i>	P8	Dinding tubul berlingkar distal/duktus pengumpul kurang telap terhadap air <i>Wall of distal convoluted tubule/collecting duct less permeable to water</i>	Dinding tubul berlingkar distal/duktus pengumpul lebih telap terhadap air <i>Wall of distal convoluted tubule/collecting duct more permeable to water</i>	P9	Kurang air diserap semula ke dalam kapilari darah <i>Less water reabsorbed into blood capillary</i>	Lebih air diserap semula ke dalam kapilari darah <i>More water reabsorbed into blood capillary</i>	P10	Menghasilkan kencing yang cair <i>Produce dilute urine</i>	Menghasilkan kencing yang pekat <i>Produce concentrated urine</i>	1
	Individual X <i>Individual X</i>	Individual Y <i>Individual Y</i>																		
P6	Kelenjar pituitari kurang dirangsang <i>Pituitary gland is less stimulated</i>	Kelenjar pituitari dirangsang <i>Pituitary gland is stimulated</i>																		
P7	Kurang ADH dirembes <i>Less ADH secreted</i>	Lebih ADH dirembes <i>More ADH secreted</i>																		
P8	Dinding tubul berlingkar distal/duktus pengumpul kurang telap terhadap air <i>Wall of distal convoluted tubule/collecting duct less permeable to water</i>	Dinding tubul berlingkar distal/duktus pengumpul lebih telap terhadap air <i>Wall of distal convoluted tubule/collecting duct more permeable to water</i>																		
P9	Kurang air diserap semula ke dalam kapilari darah <i>Less water reabsorbed into blood capillary</i>	Lebih air diserap semula ke dalam kapilari darah <i>More water reabsorbed into blood capillary</i>																		
P10	Menghasilkan kencing yang cair <i>Produce dilute urine</i>	Menghasilkan kencing yang pekat <i>Produce concentrated urine</i>																		

	C1 P1: P ialah kelenjar tiroid P is thyroid gland P2: P/kelenjar tiroid tidak/kurang dirangsang P/thyroid gland is not/less stimulated P3: Kurang hormon tiroksina dirembeskan Less secretion of thyroxine hormone C2 P4: Q ialah kelenjar adrenal Q is adrenal gland P5: Q/kelenjar adrenal kurang dirangsang Q/adrenal gland less stimulated P6: Kurang hormon adrenalina dirembeskan Less secretion of adrenaline hormone P7: Kadar metabolisme berkurang Metabolic rate decreases P8: Tiada haba berlebihan dijana No excess heat generated P9: Suhu badan menurun kepada normal Body temperature decreases back to normal	1 1 1 1 1 1 1 1 1													
(c)	Dapat terangkan perbezaan neuron M dan neuron N. Able to explain the differences between neurone M and neurone N. Contoh Jawapan: Sample Answers: <table><tr><td></td><td>Neuron M <i>Neurone M</i></td><td>Neuron N <i>Neurone N</i></td></tr><tr><td>P1</td><td>Neuron deria <i>Sensory neurone</i></td><td>Neuron motor <i>Motor neurone</i></td></tr><tr><td>P2</td><td>Terdapat pada akar dorsal saraf tunjang/ spina <i>Can be found in the dorsal root of spinal cord/ nerve</i></td><td>Terdapat pada akar ventral saraf tunjang/ spina <i>Can be found in the ventral root of spinal cord/ nerve</i></td></tr><tr><td>P3</td><td>Badan sel terdapat dalam ganglion akar dorsal <i>Body cell is found in dorsal root ganglion</i></td><td>Badan sel terdapat dalam jirim kelabu saraf tunjang <i>Body cell is found in grey matter</i></td></tr></table>		Neuron M <i>Neurone M</i>	Neuron N <i>Neurone N</i>	P1	Neuron deria <i>Sensory neurone</i>	Neuron motor <i>Motor neurone</i>	P2	Terdapat pada akar dorsal saraf tunjang/ spina <i>Can be found in the dorsal root of spinal cord/ nerve</i>	Terdapat pada akar ventral saraf tunjang/ spina <i>Can be found in the ventral root of spinal cord/ nerve</i>	P3	Badan sel terdapat dalam ganglion akar dorsal <i>Body cell is found in dorsal root ganglion</i>	Badan sel terdapat dalam jirim kelabu saraf tunjang <i>Body cell is found in grey matter</i>	1 1 1	4
	Neuron M <i>Neurone M</i>	Neuron N <i>Neurone N</i>													
P1	Neuron deria <i>Sensory neurone</i>	Neuron motor <i>Motor neurone</i>													
P2	Terdapat pada akar dorsal saraf tunjang/ spina <i>Can be found in the dorsal root of spinal cord/ nerve</i>	Terdapat pada akar ventral saraf tunjang/ spina <i>Can be found in the ventral root of spinal cord/ nerve</i>													
P3	Badan sel terdapat dalam ganglion akar dorsal <i>Body cell is found in dorsal root ganglion</i>	Badan sel terdapat dalam jirim kelabu saraf tunjang <i>Body cell is found in grey matter</i>													

	P4	Menerima impuls daripada reseptor <i>Receive impulse from receptors</i>	Menerima impuls daripada neuron deria <i>Receive impulse from sensory neurone</i>	1		
	P5	Impuls di hantar ke saraf tunjang <i>Impulse is transmitted to the spinal cord</i>	Impuls dihantar ke efektor / otot kuadriseks <i>Impulse is transmitted to effector / quadriceps muscles</i>			1
	Mana-mana 4 P <i>Any 4 P</i>					
JUMLAH					20	

SOALAN 10

No.	Skema markah	Sub Markah	Jum Markah
(a)(i)	Dapat menyatakan dua trait dominan bagi pokok kacang pea tersebut. <i>Able to state two dominant traits of the pea plant.</i> Jawapan: <i>Answer:</i> P1: Biji bulat <i>Round seed</i> P2: Biji kuning <i>Yellow seed</i> Reject: round and yellow Accept: round and yellow seed	1 1	2
(a)(ii)	Dapat membina rajah skema pewarisan yang menunjukkan kacukan sesama generasi F1. <i>Able to build schematic diagram that show the cross between F1 generation.</i> Contoh Jawapan: <i>Sample Answers:</i>	1	8

Fenotip F1: Biji bulat dan kuning x Biji bulat dan kuning <i>Phenotype F1</i>	1																									
P1: Genotip F1: BbRr x BbRr <i>Genotype F1</i>	1																									
P2: Meiosis <i>Meiosis</i>	1																									
P3: Gamet <i>Gamete</i>																										
P4: Persenyawaan <i>Fertilisation</i>																										
<table><tr><td>Gamet jantan <i>Male gamete</i></td><td>BR</td><td>Br</td><td>bR</td><td>br</td></tr><tr><td>Gamet betina <i>Female gamete</i></td><td>BR BBRR Bulat, kuning <i>round and yellow seed</i></td><td>BBRr Bulat, kuning <i>round and yellow seed</i></td><td>BbRR Bulat, kuning <i>round and yellow seed</i></td><td>BbRr Bulat, kuning <i>round and yellow seed</i></td></tr><tr><td>Br</td><td>BBRr Bulat, kuning <i>round and yellow seed</i></td><td>BBrr Bulat, hijau <i>round and green seed</i></td><td>BbRr Bulat, kuning <i>round and yellow seed</i></td><td>Bbrr Bulat, hijau <i>round and green seed</i></td></tr><tr><td>bR</td><td>BbRR Bulat, kuning <i>round and yellow seed</i></td><td>BbRr Bulat, kuning <i>round and yellow seed</i></td><td>bbRR Kedut, kuning <i>wrinkled and yellow seed</i></td><td>bbRr Kedut, kuning <i>wrinkled and yellow seed</i></td></tr><tr><td>br</td><td>BbRr Bulat, kuning <i>round and yellow seed</i></td><td>Bbrr Bulat, hijau <i>round and green seed</i></td><td>bbRr Kedut, kuning <i>wrinkled and yellow seed</i></td><td>bbrr Kedut, hijau <i>wrinkled and green seed</i></td></tr></table>	Gamet jantan <i>Male gamete</i>	BR	Br	bR	br	Gamet betina <i>Female gamete</i>	BR BBRR Bulat, kuning <i>round and yellow seed</i>	BBRr Bulat, kuning <i>round and yellow seed</i>	BbRR Bulat, kuning <i>round and yellow seed</i>	BbRr Bulat, kuning <i>round and yellow seed</i>	Br	BBRr Bulat, kuning <i>round and yellow seed</i>	BBrr Bulat, hijau <i>round and green seed</i>	BbRr Bulat, kuning <i>round and yellow seed</i>	Bbrr Bulat, hijau <i>round and green seed</i>	bR	BbRR Bulat, kuning <i>round and yellow seed</i>	BbRr Bulat, kuning <i>round and yellow seed</i>	bbRR Kedut, kuning <i>wrinkled and yellow seed</i>	bbRr Kedut, kuning <i>wrinkled and yellow seed</i>	br	BbRr Bulat, kuning <i>round and yellow seed</i>	Bbrr Bulat, hijau <i>round and green seed</i>	bbRr Kedut, kuning <i>wrinkled and yellow seed</i>	bbrr Kedut, hijau <i>wrinkled and green seed</i>	2+2
Gamet jantan <i>Male gamete</i>	BR	Br	bR	br																						
Gamet betina <i>Female gamete</i>	BR BBRR Bulat, kuning <i>round and yellow seed</i>	BBRr Bulat, kuning <i>round and yellow seed</i>	BbRR Bulat, kuning <i>round and yellow seed</i>	BbRr Bulat, kuning <i>round and yellow seed</i>																						
Br	BBRr Bulat, kuning <i>round and yellow seed</i>	BBrr Bulat, hijau <i>round and green seed</i>	BbRr Bulat, kuning <i>round and yellow seed</i>	Bbrr Bulat, hijau <i>round and green seed</i>																						
bR	BbRR Bulat, kuning <i>round and yellow seed</i>	BbRr Bulat, kuning <i>round and yellow seed</i>	bbRR Kedut, kuning <i>wrinkled and yellow seed</i>	bbRr Kedut, kuning <i>wrinkled and yellow seed</i>																						
br	BbRr Bulat, kuning <i>round and yellow seed</i>	Bbrr Bulat, hijau <i>round and green seed</i>	bbRr Kedut, kuning <i>wrinkled and yellow seed</i>	bbrr Kedut, hijau <i>wrinkled and green seed</i>																						

	Notes: P5&P6: Semua 16 genotip betul : 2 markah <i>All 16 genotypes correct : 2 mark</i> 8-15 genotip betul: 1 markah 8-15 <i>genotype correct : 1 mark</i> P7&P8: Semua 16 fenotip betul : 2 markah <i>All 16 phenotypes correct : 2 mark</i> 8-15 fenotip betul: 1 markah 8-15 <i>phenotype correct : 1 mark</i> P9: Nisbah fenotip/<i>Phenotype ratio</i>: 9 (biji bulat,kuning):3(biji bulat,hijau):3(biji kedut,kuning):1(biji kedut,hijau) 9 (<i>round and yellow seed</i>):3(<i>round and green seed</i>):3(<i>wrinkled and yellow seed</i>):1(<i>wrinkled and green seed</i>) Notes: P9 wajib ada + mana-mana P	1			
(b)	Dapat membanding bezakan antara kacukan pewarisan dalam Rajah 10.2 dengan kacukan yang ditunjukkan dalam Rajah 10.1. <i>Able to compare between this genetic cross in Diagram 10.2 with the cross shown in Diagram 10.1.</i> Contoh Jawapan: <i>Sample Answers:</i> Persamaan/ <i>Similarities</i>: S1: Kedua-duanya dikawal oleh gen <i>Both controlled by gene</i> S2: Kedua-duanya mematuhi Hukum Mendel <i>Both follow Mendel's Law</i> S3: Kedua-duanya melibatkan penggunaan segiempat Punnet (untuk meramal kebarangkalian anak) <i>Both involve the use Punnet square (to predict the probability of offspring)</i> S4: Kedua-duanya melibatkan gabungan alel setiap induk <i>Both involve combination of alleles of each parent</i> Perbezaan/ <i>Differences</i>: <table><tr><td></td><td>Rajah 10.2</td><td>Rajah 10.1</td></tr></table>		Rajah 10.2	Rajah 10.1	1
	Rajah 10.2	Rajah 10.1			

		<i>Diagram 10.2</i>	<i>Diagram 10.1</i>		
	D1:	Kacukan monohibrid <i>Monohybrid cross</i>	Kacukan dihibrid <i>Dihybrid cross</i>	1	
	D2:	Melibatkan satu pasang alel// satu jenis gen <i>Involves one pair of allele//one type of gene</i>	Melibatkan dua pasang alel// dua jenis gen <i>Involves two pair of allele//two types of gene</i>	1	
	D3:	Melibatkan satu ciri pokok pea//Melibatkan dua trait pokok pea <i>Involves one characteristic of the pea plant</i>	Melibatkan dua ciri pokok pea//Melibatkan empat trait pokok pea <i>Involves two characteristics of the pea plant</i>	1	
	D4:	Ciri: Ketinggian <i>Characteristic: Height</i>	Ciri: Jenis biji, Warna biji <i>Characteristic: Type of seed, Colour of seed</i>	1	
	D5:	Trait: Pokok tinggi, pokok rendah <i>Trait: Tall tree, short tree</i>	Trait: Biji bulat, biji kedut, biji kuning, biji hijau <i>Traits: Round seed, wrinkled seed, yellow seed, green seed</i>	1	
	D6:	Melibatkan Hukum Mendel I// Hukum Segregasi <i>Involves Mendel's First law// Law of Segregation</i>	Melibatkan Hukum Mendel II// Hukum Pengaturan Bebas <i>Involves Mendel's Second Law// Law of Independent Assortment</i>	1	
	Sekurang-kurangnya satu S dan satu D <i>At least one S and one D</i>				
(c)	Boleh menerangkan perbezaan antara penyakit yang dialami oleh individu M dan individu N. <i>Able to explain the differences between the two diseases experienced by individual M and N.</i> Contoh Jawapan: <i>Sample Answers:</i> Persamaan/ <i>Similarities:</i>				5

	S1: Kedua-duanya terjadi akibat tak disjungsi kromosom// Kromosom homolog/kromatid kembar gagal berpisah <i>Both occur due to non disjunction of chromosome// Homologous chromosomes/sister chromatid failed to separate</i>	1	
	S2: Kedua-duanya melibatkan persenyawaan gamet normal dengan gamet abnormal <i>Both involved fertilization between normal and abnormal gamete</i>	1	
	S3: Kedua-duanya merupakan mutasi kromosom <i>Both are chromosomal mutation</i>	1	
	S4: Kedua-duanya mempunyai bilangan kromosom abnormal <i>Both have abnormal number of chromosomes</i>	1	
	Perbezaan/ Differences:		
		1	
		1	
		1	
		1	
		1	
		1	

	Individu M <i>Individual M</i>	Individu N <i>Individual N</i>	
D1:	Sindrom Down <i>Down syndrome</i>	Sindrom Turner <i>Turner syndrome</i>	
D2:	Jumlah kromosom ialah 47 <i>Total of chromosomes are 47</i>	Jumlah kromosom ialah 45 <i>Total of chromosomes are 45</i>	
D3:	Terdapat satu kromosom lebih pada pasangan kromosom no 21 <i>There is an extra chromosome for chromosome pair number 21</i>	Terdapat kekurangan satu kromosom X pada pasangan kromosom seks <i>There is a missing X chromosome in the pair of sex chromosomes</i>	
D4:	Boleh berlaku kepada lelaki atau perempuan <i>Can occur in both males and females</i>	Boleh berlaku kepada perempuan sahaja <i>Can occur in females only</i>	
D5:	Mempunyai mata sepet/hidung penyek/lidah terjelir/dahi lebar/terencat akal <i>Has slant eyes/flat nose/protruding tongue/broad forehead/mentally retarded</i>	Mandul/Kekurangan ciri-ciri seks sekunder perempuan/Buah dada/Ovari tidak berkembang/Mempunyai kulit berlipat pada kawasan leher/leher bertaub/IQ rendah <i>Sterile female/Lack of secondary female characteristics/Undevelop</i>	

			<i>ed breasts/ovaries/Have folded skin on the neck area/Weblike neck/Low IQ</i>	1	
D6:	Melibatkan ketidaknormalan pada autosom <i>Involve abnormality in autosome</i>	Melibatkan ketidaknormalan pada kromosom seks <i>Involve abnormality in sex chromosomes</i>			
Sekurang-kurangnya satu S dan satu D <i>At least one S and one D</i>					
JUMLAH					20

SOALAN 11

No.	Skema markah	Sub Markah	Jum Markah
(a) (i)	Dapat menerangkan satu ciri fizikal pokok keladi bunting yang membolehkannya menjadi hiperakumulator yang efisien. <i>Able to explain one physical characteristic of water hyacinth that makes the plant an efficient hyperaccumulator.</i> Contoh jawapan: <i>Sample answer:</i> P1: Akar yang panjang <i>Long roots</i> P2: Permukaan akar yang besar <i>Large surface area of roots</i> P3: Lebih banyak penyerapan/pengumpulan logam berat <i>More absorption / accumulation of heavy metals</i> Terima P1 atau P2 sekali sahaja <i>Accept P1 OR P2 once only</i>	1 1 1	2
(a)(i)	Dapat menerangkan kesan pokok keladi bunting menjadi spesies invasif ke atas tahap BOD. <i>Able to explain the effects of water hyacinth of being an invasive species on BOD level.</i> Contoh jawapan: <i>Sample answer:</i> P1: populasi pokok keladi bunting membiak dengan cepat <i>population of water hyacinth reproduce rapidly</i>	1	7

	P2: Keladi bunting menutup permukaan air <i>water hyacinth covers surface of water</i> P3: Menghalang kemasukan/ penembusan cahaya <i>Prevent the penetration of sunlight into water</i> P4: Kadar fotosintesis tumbuhan akuatik menurun <i>Rate of photosynthesis of aquatic plants decreases</i> P5: Tumbuhan/haiwan akuatik mati <i>Aquatic plants/animals die</i> P6: Populasi bakteria pengurai meningkat <i>Population of decomposer bacteria increases</i> P7: Bakteria pengurai (aerobik) menggunakan oksigen (terlarut) dalam air // kandungan oksigen (terlarut) menjadi rendah <i>(Aerobic) decomposer bacteria use (dissolve) oxygen //(dissolved) oxygen content decreases</i> P8: Tahap BOD meningkat <i>BOD level increases</i> Mana-mana 7P Any 7P	1 1 1 1 1 1 1	
(b)	Dapat membincangkan kepentingan sekuriti makanan semasa pandemik yang berlaku pada tahun 2020. <i>Able to discuss the importance of food security during pandemic in 2020.</i> Contoh Jawapan: <i>Sample Answers:</i> P1: Bekalan makanan yang mencukupi / berkualiti <i>Sufficient/ high-quality of food supply</i> P2: Dalam pasaran tempatan / bekalan makanan yang diimport <i>In the local market /imported food</i> P3: Makanan mudah diperolehi <i>Food can be obtained easily</i> P4: Menampung keperluan diet / bernutrisi <i>To meet needs of diet/ nutrition</i> P5: Kemampuan untuk mendapatkan nutrien (yang mencukupi) <i>Ability of getting (enough) nutrients</i> P6: Melalui pemakanan / air yang bersih <i>By consuming food / drinking clean water</i> P7: Pemprosesan dan penyediaan makanan yang baik <i>Good practices in food processing and preparation</i>	1 1 1 1 1 1 1	6

