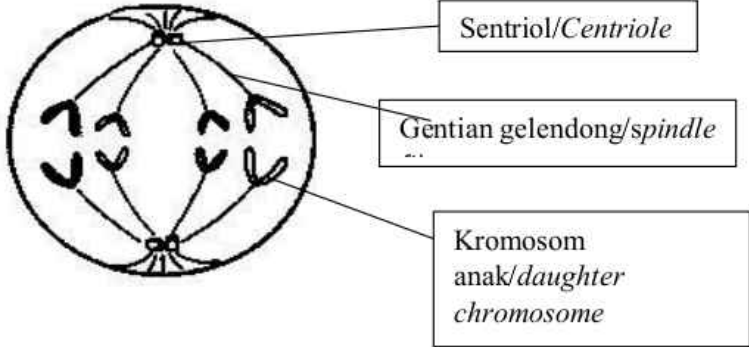


No.	Kriteria pemarkahan	Markah	
8.a	Dapat menamakan pembahagian sel P dan Q <i>Able to name the cell divisions of P and Q</i> Jawapan <i>Answer</i> P : Mitosis / <i>Mitosis</i> Q : Meiosis / <i>Meiosis</i>	1 1	2
b	Dapat menerangkan bagaimana pembahagian sel Q boleh mengekalkan bilangan kromosom. <i>Able to explain how cell division Q can maintained the number of chromosomes.</i> Jawapan <i>Answers</i> P1:Pembahagian sel yang berlaku dalam organ pembiakan. <i>Cell division that occurred in reproductive organ.</i> P2:Menghasilkan gamet yang mempunyai bilangan kromosom separuh (haploid) daripada bilangan kromosom sel induknya.(diploid) <i>Produce gametes that have half number of chromosomes than the number of chromosomes of the parent cell.</i>	1 1	2
c.	Dapat melukis dan melabel dengan betul. <i>Able to draw and labelled the anaphase stage.</i> Contoh jawapan <i>Sample answers</i>  Draw - 1 Label - 1	2	
d.i	Dapat nyatakan penyakit genetik <i>Able to state the genetic disorder</i> Jawapan <i>Contoh</i> <i>Sindrom Down</i>	1	

	<i>Down's Syndrome</i>		
d.ii	Dapat menerangkan bagaimana individu mendapat penyakit genetik tersebut <i>Able to explain how the individual get the genetic disease.</i> Contoh jawapan <i>Sample aswers</i> P1:Gentian gelendong gagal berfungsi ketika anafasa I atau anafasa II. <i>Spindle fibres fail to function during anaphase I and anaphase II.</i> P2 : Kromosom gagal berpisah(tak disjunksi) <i>Chromosome fail to separate</i> P3: Gamet mempunyai bilangan kromosom tidak normal(22atau 24 kromosom) <i>Gametes have an abnormal number of chromosomes</i> Mana-mana dua P <i>Any two P</i>	1 1 1	
	Jumlah	9	

Item Num.	Scoring Criteria	Mark	
5(a)	Able to name stage X and stage Y <i>Answer:</i> Stage X: Prophase I Stage Y: Metaphase I	1 1	2
5(b)(i)	Able to identify type of cell division <i>Answer:</i> Meiosis	1	1
5(b)(ii)	Able to give one reason for the answer in 5(b)(i) <i>Suggestion answer:</i> P1: crossing over occurs in the cell division P2: homologous chromosomes are arranged side by side at the equatorial plane	1 1	2

3

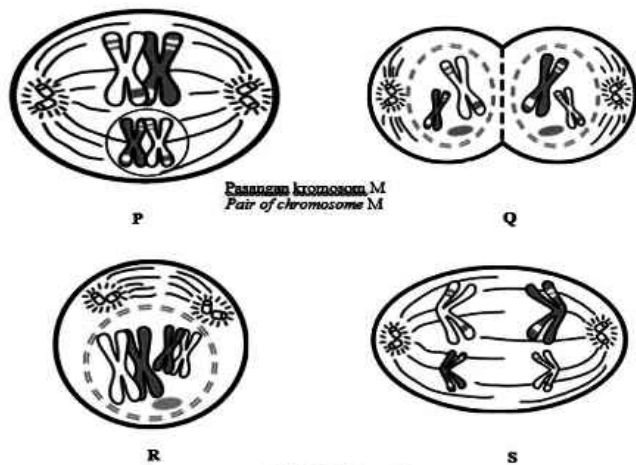
5(c)	Able to state two differences between the division in cell Q and cell P. <i>Suggested answer :</i>																
	<table border="1"> <thead> <tr> <th>Cell Q</th><th>Cell P</th></tr> </thead> <tbody> <tr> <td>D1: no synapsis occurs in prophase stage</td><td>Synapsis occurs in prophase stage</td></tr> <tr> <td>D2: chromosome align at the equatorial plane</td><td>Homologous chromosomes pair align at the equatorial plane</td></tr> <tr> <td>D3: one phase of cell division</td><td>Two phase of cell division</td></tr> <tr> <td>D4: produce two daughter cells</td><td>Produce four daughter cells</td></tr> <tr> <td>D5: diploid chromosome in daughter cell</td><td>Haploid chromosome in daughter cell</td></tr> <tr> <td>D6: involve (in production of) somatic cell</td><td>Involve (in production of) gamete</td></tr> </tbody> </table>	Cell Q	Cell P	D1: no synapsis occurs in prophase stage	Synapsis occurs in prophase stage	D2: chromosome align at the equatorial plane	Homologous chromosomes pair align at the equatorial plane	D3: one phase of cell division	Two phase of cell division	D4: produce two daughter cells	Produce four daughter cells	D5: diploid chromosome in daughter cell	Haploid chromosome in daughter cell	D6: involve (in production of) somatic cell	Involve (in production of) gamete	1 1 1 1 1 1	Maks 2
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5 (d)	Able to explain how tissue culture technique can ensure all the orchid offspring are the ones with red flowers. <i>Suggested answers:</i> P1: (tissue culture technique) is the application of cell division by mitosis P2: the daughter cells produced by mitosis will have the same genetics content like the parent cells P3: this ensure that all the orchid offspring produced have the same characteristics as the parents. P4: No mixing of genetics content from other parent plant	1 1 1 1	Maks 3														
Total		8															

NO SOALAN		CADANGAN JAWAPAN	MARKAH	JUMLAH MARKAH
5	(a)(i)	Meiosis / <i>Meiosis</i>	1	1
	(a)(ii)	P1 : Kromosom homolog berpasangan / sinapsis berlaku (membentuk bivalen/tetrad) <i>The pairing of homologous chromosomes/ synapsis occurs (forms bivalent/tetrad)</i> P2 : Proses pindah silang antara kromatid bukan seiras / kromosom homolog berlaku <i>The crossing over between non-identical chromatids / homologous chromosomes takes place.</i>	1 1	2
	(b)(i)	Sindrom Down / <i>Down Syndrome</i>	1	1
	(b)(ii)	F : J ialah gentian gelendong / <i>J is spindle fibres</i> P1 : Struktur J / gentian gelendong gagal berfungsi / terbentuk ketika / meiosis 1 / anafasa I / anafasa II <i>J structure / the spindle fibers fail to function / develop during meiosis 1/ anaphase I/ anaphase II.</i> P2 : Kromosom ke-21 gagal berpisah // tak disjungsi kromosom ke-21 berlaku <i>The 21st chromosome fails to separate // nondisjunction of 21st chromosome occur</i> P3: Menghasilkan gamet dengan dua salinan kromosom pada kromosom ke-21 <i>Produces gametes with two copies of the chromosome on 21st chromosomes</i> P4 : (Apabila) persenyawaan antara gamet normal (23 kromosom) dan gamet abnormal (24 kromosom) berlaku, zigot akan mempunyai 47 kromosom // 3 kromosom pada kromosom ke-21 <i>(When) fertilization between a normal gamete (23 chromosomes) and an abnormal chromosome (24 chromosomes) occurs, the zygote will carry 47 chromosomes // 3 chromosomes at 21st chromosome</i> F dan mana-mana 3P <i>F and any 3P</i>	1 1 1 1	4
Jumlah markah				8

No. Item	Kriteria Pemarkahan / Scoring Criteria	Markah Mark	
11(a)	Dapat menerangkan apa yang berlaku semasa fasa X <i>Able to explain what happen during phase X</i> Cadangan jawapan / <i>Suggested answer:</i> G1 P1: sintesis protein / organel baru <i>P1: synthesized a new protein / organelles</i> P2: kadar metabolisme sel tinggi <i>P2: the metabolic rate of the cell is high</i> S P3: mensintesis DNA <i>P3: synthesizing of DNA</i> P4: DNA mengalami replikasi <i>P4: DNA undergoes replication</i> P5: membentuk duplikasi kromosom // setiap kromosom mengandungi dua kromatid seiras / kromatid kembar <i>P5: form duplicated chromosome // each chromosome consist of two identical chromatids / sister chromatids</i> G2 P6: pengumpulan tenaga <i>P6: accumulation of energy</i> Mana-mana 3 Any 3	3 1 1 1 1 1 1	
11(b)(i)	Dapat menerangkan mengapa semua anak pokok yang terhasil adalah seiras dari segi genetik dengan tumbuhan induk <i>Able to explain why all the offspring produced are genetically identical to their parent's plant.</i> Cadangan jawapan / <i>Suggested answer:</i> F: teknik P ialah kultur tisu / pengklonan <i>F: technique P is tissue culture / cloning</i> P1: (anak pokok) ialah klon <i>P1: (Plant offspring) is clone</i> P2: mempunyai maklumat / bahan genetik / DNA yang sama dengan induk <i>P2: have same DNA / genetic material / content to the parent</i> P3: tiada variasi <i>P3: no variation</i> P4: melibatkan mitosis sahaja / meiosis tidak berlaku <i>P4: involve mitosis only / meiosis cannot occur</i> P5: pembiakan aseks <i>P5: asexual reproduction</i>	7 1 1 1 1 1 1	

P8: tiada variasi / pemilihan semulajadi / tidak dapat menghasilkan baka / varieti baru / <i>P8: no variation / natural selection / unable to produce a new breed / variety</i>	1	
Dapat menerangkan teknik penghasilan daging ruminan dengan betul <i>Able to explain the technique to produce ruminant meat correctly</i> Rubrik / Rubric: C1 – nama teknik - 1 markah <i>C1 – technique name – 1 mark</i> C2 – penerangan teknik – maks 3 markah <i>C2 – explanation technique – max 3 marks</i> Cadangan jawapan / <i>Suggested answer:</i> <u>C1</u> P1: Teknik pengkulturan (daging) <i>P1: (Meat) culturing technique</i> Reject: Pengklonan / <i>Cloning</i> <u>C2</u> P2: sel stem dari haiwan di ambil <i>P2: stem cells from animal are taken</i> P3: (sel stem) dikultur dalam pring petri / medium kultur <i>P3: (stem cells) are cultured in petri dish / cultured medium</i> P4: yang mengandungi nutrien / dalam keadaan steril <i>P4: with contain nutrien / sterilize condition</i> P5: (sel stem) membahagi secara mitosis <i>P5: (stem cells) divide by mitosis</i> P6: Gentian otot terbentuk <i>P6: muscle fibres are formed</i>	1	4
Jumlah / Total		20

7 Rajah 7 menunjukkan peringkat-peringkat yang berbeza dalam suatu pembahagian sel.
Diagram 7 shows the different stages in a cell division.



Rajah 7 / Diagram 7

(a)	(i)	Namakan peringkat P dan jenis pembahagian sel yang ditunjukkan dalam Rajah 7. Name stage P and type of cell division shown in Diagram 7.
		Peringkat P: .. Metafasa I Stage P Jenis pembahagian sel: .. Meiosis Type of cell division

(ii) Nyatakan kepentingan peringkat P.
State the importance of stage P.

- Menghasilkan variasi kepada sel anak
- Memastikan kromosom homolog membahagi dengan sama rata

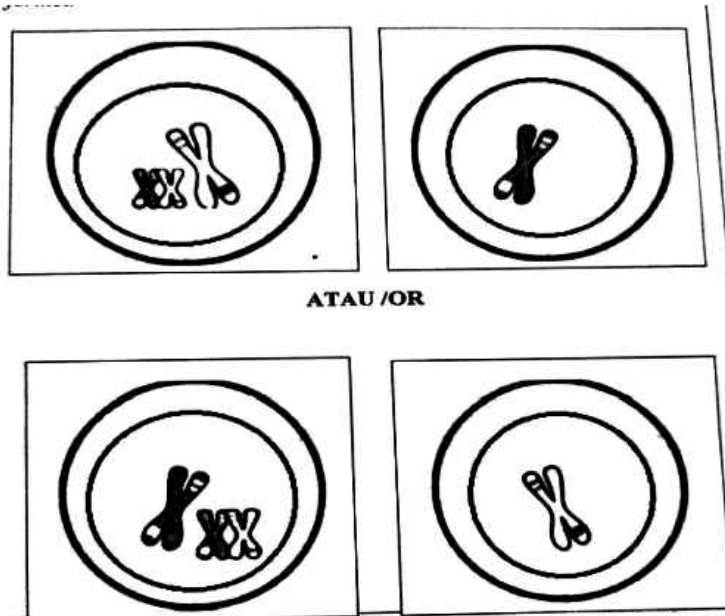
(b) (i) Pendedahan kepada radiasi sinar X menyebabkan mutasi berlaku semasa proses pembahagian sel tersebut.
Situasi ini menyebabkan pasangan kromosom M tidak berpisah.
Exposure to X-Ray radiation causes mutation during the cell division.
This situation causes the pair of chromosome M not separated.

Namakan jenis mutasi tersebut.
Name the type of mutation.

Mutasi kromosom

[1 markah/mark]

(ii) Lengkapkan rajah kedua-dua sel anak yang akan terbentuk pada ruang yang disediakan di bawah.
Complete the diagram for the two daughter cells which will be formed in the spaces provided below.



(c) Seorang wanita menghidap kanser dan telah menjalani rawatan radioterapi melahirkan bayi yang mengalami Sindrom Down.
A woman with cancer and has undergone radiotherapy treatment gave birth to a Down's Syndrome baby.

Wajarkan kesan rawatan radioterapi yang menyebabkan sindrom tersebut.
Justify the effect of radiotherapy treatment that causes the syndrome.

- Radiasi ialah mutagen yang digunakan dalam rawatan radioterapi // menyebabkan ketidaknormalan semasa meiosis.
- Gentian gelendong musnah/ gagal berfungsi ketika anafasa I / anafasa II
- Kromosom homolog gagal berpisah ketika anafasa I / kromatid kembar gagal berpisah ketika di anafasa II // tak disjungsi berlaku.
- Gamet mempunyai bilangan kromosom tidak normal / berkurang/n+1 / n-1.
- Gamet tidak normal bersenyawa dengan gamet normal.
- Menghasilkan zigot yang tidak normal/ kromosom tambahan pada set 21 / trisomy 21 / 47 bilangan kromosom