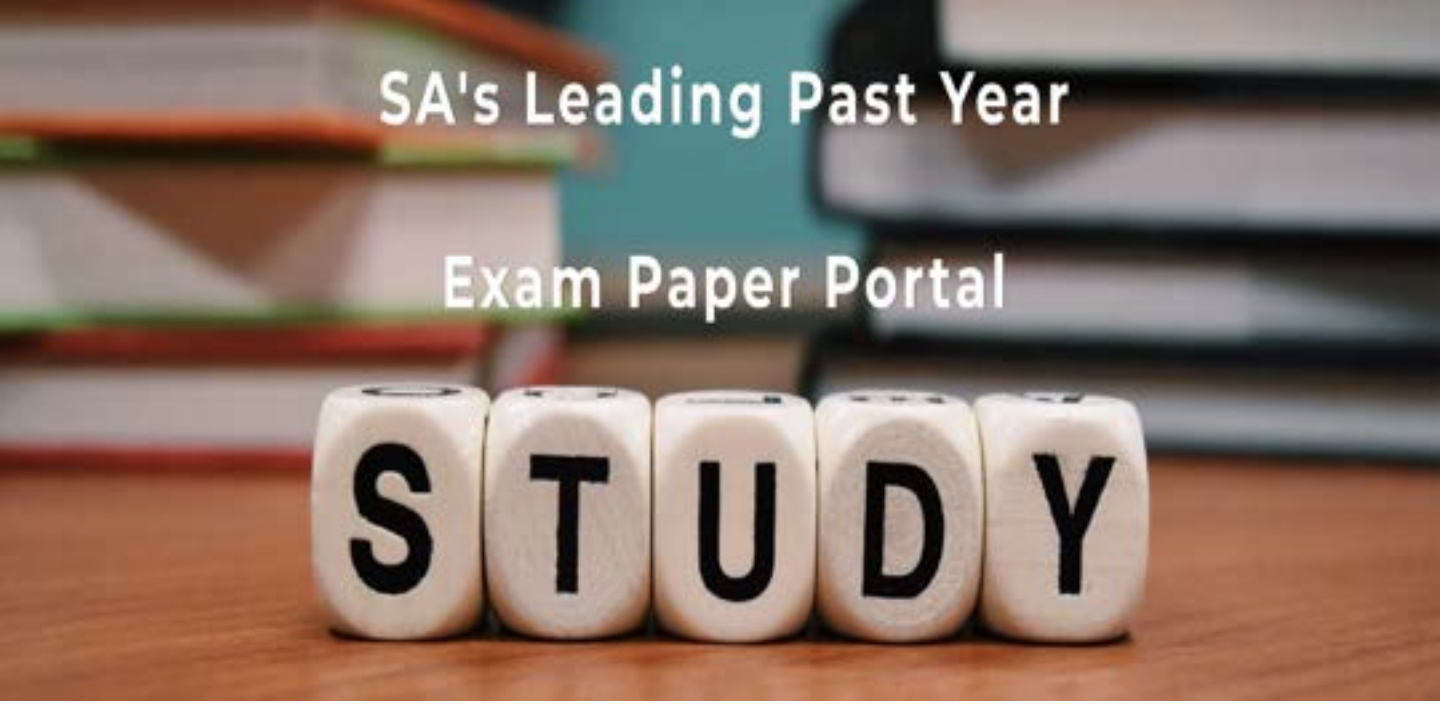

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GRADE 12

LIFE SCIENCES P1

VERSION 2 (OLD CONTENT) FOR PART-TIME CANDIDATES

NOVEMBER 2012

FINAL MEMORANDUM

MARKS: 150

This memorandum consists of 10 pages.

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PRINCIPLES RELATED TO MARKING LIFE SCIENCES 2012

1. **If more information than marks allocated is given**
   Stop marking when maximum marks is reached and put a wavy line and 'max' in the right hand margin.

2. **If, for example, three reasons are required and five are given**
   Mark the first three irrespective of whether all or some are correct/incorrect.

3. **If whole process is given when only part of it is required**
   Read all and credit relevant part.

4. **If comparisons are asked for and descriptions are given**
   Accept if differences / similarities are clear.

5. **If tabulation is required but paragraphs are given**
   Candidates will lose marks for not tabulating.

6. **If diagrams are given with annotations when descriptions are required**
   Candidates will lose marks

7. **If flow charts are given instead of descriptions**
   Candidates will lose marks.

8. **If sequence is muddled and links do not make sense**
   Where sequence and links are correct, credit. Where sequence and links are incorrect, do not credit. If sequence and links becomes correct again, resume credit.

9. **Non-recognized abbreviations**
   Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation but credit the rest of answer if correct.

10. **Wrong numbering**
    If answer fits into the correct sequence of questions but the wrong number is given, it is acceptable.

11. **If language used changes the intended meaning**
    Do not accept.

12. **Spelling errors**
    If recognisable accept provided it does not mean something else in Life Sciences or if it is out of context**.**

13. **If common names given in terminology**
    Accept provided it was accepted at the National memo discussion meeting.

14. **If only letter is asked for and only name is given (and vice versa)**
    No credit

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15. **If units are not given in measurements**
Candidates will lose marks. Memorandum will allocate marks for units separately

16. Be sensitive to the **sense of an answer, which may be stated in a different way**.

17. **Caption**
All illustrations (diagrams, graphs, tables, etc.) must have a caption

18. **Code-switching of official languages (terms and concepts)**
A single word or two that appears in any official language other than the learners' assessment language used to the greatest extent in his/her answers should be credited, if it is correct. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official languages.

19. No changes must be made to the marking memoranda without consulting the Provincial Internal Moderator who in turn will consult with the National Internal Moderator (and the External moderators where necessary)

20. Only memoranda bearing the signatures of the National Internal Moderator and the UMALUSI moderators and distributed by the National Department of Education via the Provinces must be used.

SECTION A

QUESTION 1

1.1	1.1.1	B✓✓		
	1.1.2	C✓✓		
	1.1.3	A ✓✓		
	1.1.4	A✓✓		
	1.1.5	D✓✓		
	1.1.6	C✓✓		
	1.1.7	A✓✓		
	1.1.8	B✓✓		
	1.1.9	A✓✓	(9 x 2)	**(18)**
1.2	1.2.1	Interphase✓		
	1.2.2	DNA profiling✓/ DNA fingerprint		
	1.2.3	Amniotic✓ fluid		
	1.2.4	Anther✓		
	1.2.5	Fraternal✓/non-identical/heterozygotic/dizygotic		
	1.2.6	Cloning✓		**(6)**
1.3	1.3.1	Both A and B✓✓		
	1.3.2	A only✓✓		
	1.3.3	B only✓✓		
	1.3.4	A only✓✓		
	1.3.5	None✓✓	(5 x 2)	**(10)**
1.4	1.4.1	46✓/23 pairs		(1)
	1.4.2	Man✓/Male		(1)
	1.4.3	Presence of X and Y chromosomes✓✓/XYchromosomes/Pair 23 has 1 small and one large chromosome/chromosomes different for pair 23		(2)
	1.4.4	A person with Down syndrome will have 3✓ copies of chromosome number 21✓ in each cell instead of 2 **OR** Trisomy✓ 21✓		(2) **(6)**
1.5	1.5.1	Recessive✓✓		(2)
	1.5.2	Brachydactyly appeared in the offspring✓ even when neither of the parents are brachydactylous✓/ both are phenotypically normal **OR** Neither parents 6 or 7 show brachydactyly✓ yet they have a son with it✓		(2)
	1.5.3	(a) Bb✓✓		(2)
		(b) bb✓✓		(2)
	1.5.4	50✓ %✓ / (½)		(2) **(10)** **[50]**

SECTION B

QUESTION 2

2.1 2.1.1 A - Centromere✓
B - Chromatid✓
C - Chromosome✓
D - Homologous✓ chromosomes/bivalent (4)

2.1.2 Crossing over✓ (1)

2.1.3 Prophase I✓ (1)

2.1.4 It ensures that the gametes produced at the end of meiosis are genetically different from each other✓/genetic variation (1)

2.1.5 Random✓/independent assortment of chromosomes (1)

Chromosomes✓/chromatids
arrange themselves randomly/independently on either side
of the equator✓ during metaphase I/II (2) (3)

2.1.6

Meiosis I	Meiosis II
- Crossing over takes place✓	- No crossing over takes place✓
- (In metaphase) the chromosomes align on the equator in homologous pairs✓	-(In metaphase) chromosomes align singly✓ on the equator
- Reduction division✓	- No reduction division✓
- During anaphase whole chromosomes✓move towards the poles	- During anaphase chromatids✓ move towards the pole
- Homologous chromosomes in prophase I✓	- Chromosomes occur singly in prophase II✓

(Mark first THREE only) any 3 x 2 + 1 table (7)
(17)

2.2 2.2.1 (a) A - Transcription✓ (1)
(b) B - Translation✓ (1)

2.2.2
- Free (RNA) nucleotides✓
- from the nucleoplasm✓
- arrange according to the base sequence✓ of the DNA template
- in a complementary✓ way/ A - U/ C - G
- (Sugar-phosphate) bonds form✓ between nucleotides to form required mRNA
- Process controlled by enzymes✓ any (5)

2.2.3 1 - GUU✓✓ (2)
2 - CAA✓✓ (2)
3 - CGT✓✓ (2) (6)
(13)
[30]

QUESTION 3

3.1	3.1.1	A – Umbilical cord✓ D – Placenta✓	(2)
	3.1.2	(a) B✓ (b) E✓	(1) (1)
	3.1.3	The villi increase the surface area✓ across which exchange of substances✓ can take place between foetal blood and maternal blood	(2)
	3.1.4	The Graafian follicle ✓in the ovary produces oestrogen✓ The corpus luteum ✓in the ovary produces progesterone✓ Both hormones thicken the endometrium✓/make it more glandular and vascular/for implantation	(5) **(11)**
3.2	3.2.1	More boys than girls can roll their tongues✓✓✓ **OR** More girls than boys can roll their tongues✓✓✓ **OR** Equal number of boys and girls can roll their tongues✓✓✓	(3)
	3.2.2	Use the same number of boys and girls✓ Increase the sample size✓ Repeat the investigation ✓ ***(Mark first TWO only)*** any	(2) **(5)**
3.3	3.3.1	$\frac{10}{125}$ ✓ x 100 ✓ **OR** $\frac{(125 - 115)}{125}$ ✓ x 100 ✓ = 8✓% = 8✓%	(3)
	3.3.2	After a sharp increase✓ in 1997 the numbers gradually decreased✓ until 2002	(2)
	3.3.3	- Sterility✓ - Sores✓ on the genitals - Unpleasant discharge✓ - Craziness✓/mental illness - Inflammation of testes✓ - Pain during urination✓ any ***(Mark first TWO only)***	(2)
	3.3.4	Education ✓/Make statistics available to warn people Provide antibiotics✓ Provide condoms✓ Research✓ to find a vaccine any ***(Mark first THREE only)***	(3) **(10)**

3.4	Surgical procedures✓ Use fertility drugs✓ Artificial insemination✓ In-vitro fertilisation✓ Gamete Intra-Fallopian Transfer✓/ (GIFT) ***(Mark first FOUR only)***	any	**(4)**
			[30]
		TOTAL SECTION B:	**60**

SECTION C

QUESTION 4

4.1
- Reduce the need for the use of chemicals✓/pesticides because the resistance of crops to pests has been increased✓/less harmful to the environment
- Selecting the best genes to produce better resistant crops✓/stronger offspring to withstand harsh environmental conditions✓
- Using specific genes to increase crop yields✓/life stock improvement for food security✓
- Selecting genes to increase shelf life✓ of plant products so that there is minimal waste✓
- Selecting genes that delay/accelerate ripening of fruits✓ to meet the demand✓ locally and internationally
- Using specific genes to improve nutritional value✓of food for better health✓
- Using specific genes to introduce new traits in crops✓ to suit specific needs✓ of a population (e.g. to increase vitamin A in food) any (3 x 2) **(6)**

(Mark first THREE x 2 only and not random points)

4.2 **P_1** phenotype Pink x Pink✓
genotype RW x RW✓

Meiosis

Gametes R, W x R, W ✓

Fertilisation

F_1 genotype RR RW RW WW✓
phenotype **1 Red** **2 Pink** **1 White✓***

Parents/P_1 and offspring/F_1✓
Meiosis and fertilisation✓

*** 1 Compulsory mark + any 5 other (6)**

OR

P_1 phenotype Pink x Pink✓
genotype RW x RW✓

Meiosis

Gametes

Fertilisation

gametes	R	W
R	RR	RW
W	RW	WW

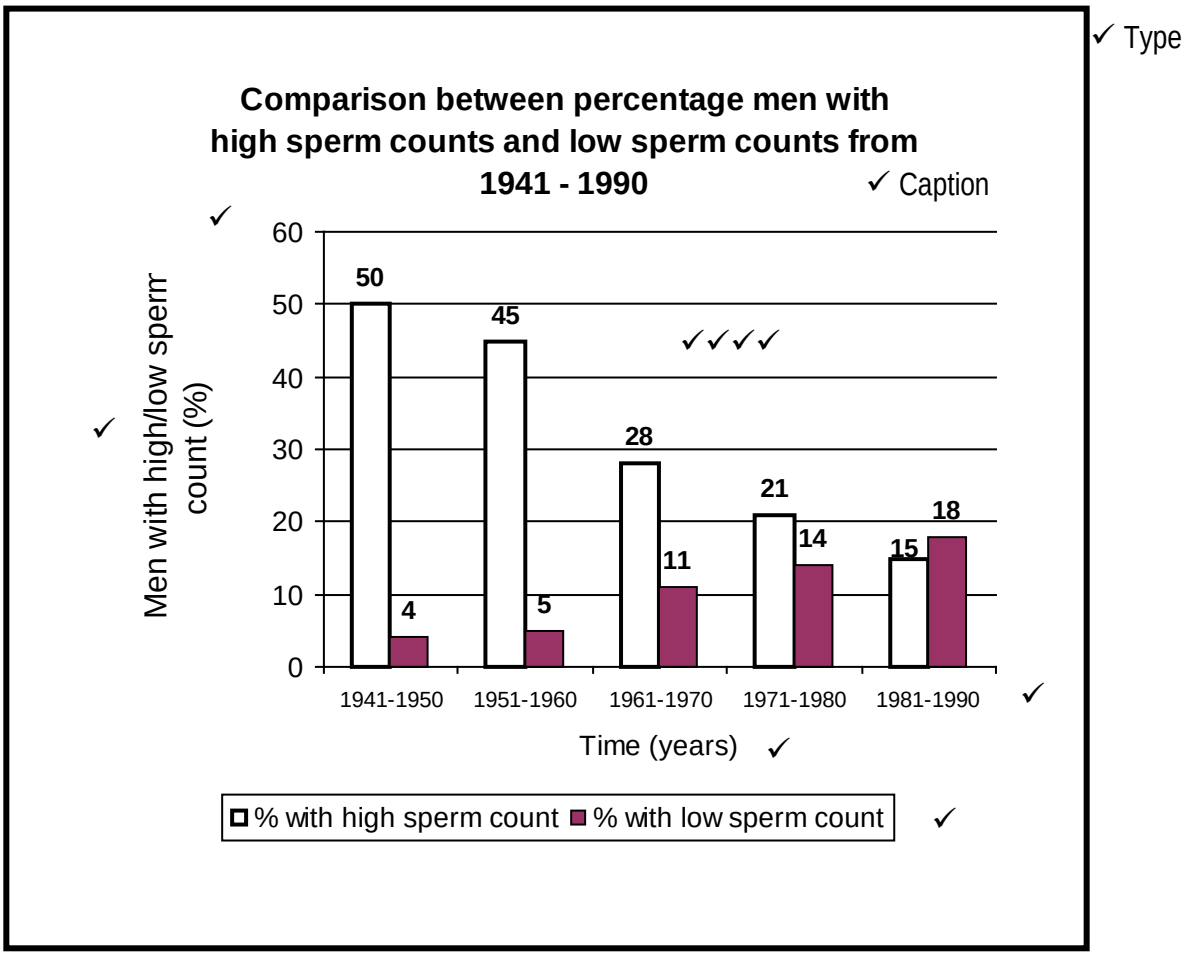
1 mark for correct gametes
1 mark for correct genotypes

F_1 phenotype **1 Red** **2 Pink** **1 White✓***

Parents/P_1 and offspring/F_1✓
Meiosis and fertilisation✓

*** 1 Compulsory mark + any 5 other (6)**

4.3
4.3.1



Mark allocation of the graph

Correct type of graph	1
Title of graph	1
Correct label and units for X-axis	1
Graphs labelled/key provided for 2 graphs	1
Correct label and units for Y-axis	1
Appropriate width and interval of bars	1
Appropriate scale for Y-axis	1
Drawing of the graphs	1: 1 to 3 bars plotted correctly 2: 4 to 6 bars plotted correctly 3: 7 to 9 bars plotted correctly 4: all 10 bars plotted correctly

(11)

NOTE

- If a histogram is drawn, marks will be lost for ‘type of graph’ and for ‘appropriate width and interval of bars’
- If any other type of graph is drawn: marks will be lost for 'correct type of graph'
- If graphs are NOT drawn on the same system of axes, mark the first graph only using the criteria given in the rubric. Do not mark the second graph.
- If axes are transposed, marks will be lost for ‘correct labels and units for X and Y axis’

4.3.2 The percentage of men with low sperm counts has increased✓ from 1941 to 1990

The percentage of men with high sperm counts has decreased✓ from 1941 to 1990 (2)
(13)

4.4 Loop/IUD✓ - It prevents fertilised eggs/embryos✓ from becoming attached to the uterine wall✓.

Female condom✓/(Femidom) - Acts as a barrier✓/stops sperm getting into the uterus✓/Fallopian tubes/eggs.

Diaphragm✓ - Covers the cervical opening✓ and prevents sperm from entering the uterus✓/acts as a barrier/getting to eggs.

Contraceptive pill✓ - Contains artificially produced hormones✓ which prevents the production of eggs/ovulation✓.

Spermicides✓ - Contain a chemical substance that kills sperm✓ and it also acts as a barrier, which prevents sperm from entering through the cervix✓.

Contraceptive injections✓ - Contain progesterone✓/combination of oestrogen and progesterone which stops ovulation✓.

Female Sterilisation✓/(tubal ligation) - The fallopian tubes are cut✓ and tied during a small surgical operation preventing the fusion of sperm and egg✓.

Rhythm method✓ - Sexual intercourse is avoided✓ during ovulation✓

any 4 x 3 **(12)**

ASSESSING THE PRESENTATION OF THE ESSAY

Marks	Description
3	Well structured- demonstrate insight and understanding of question
2	Minor gaps or irrelevant information in the logic and flow of the answers
1	Attempted but with significant gaps and irrelevant information in the logic and flow of the answers
0	Not attempted/nothing written other than question number/no correct information

Synthesis (3)
(15)

TOTAL SECTION C: 40
GRAND TOTAL: 150

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