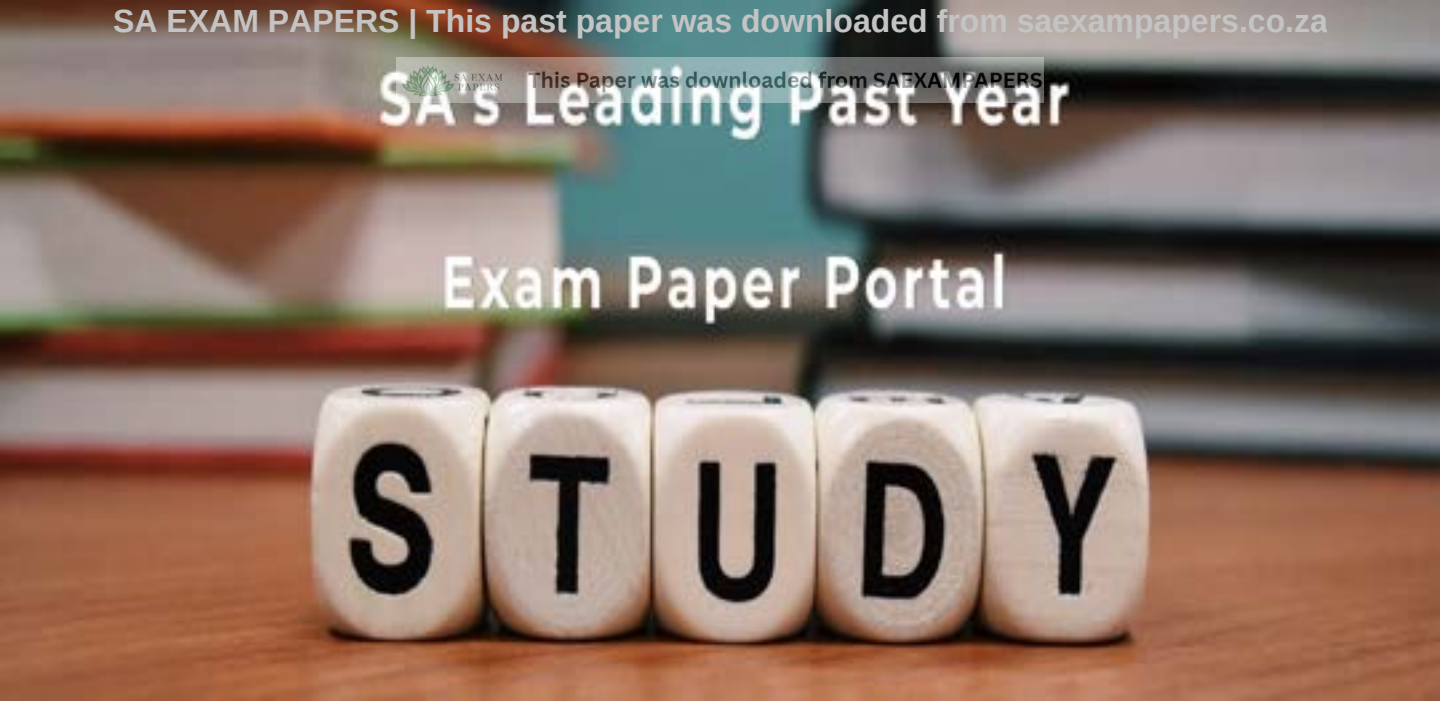


FINAL

KWAZULU-NATAL PROVINCE

EDUCATION

REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P2

PREPARATORY EXAMINATION

MARKING GUIDELINE

SEPTEMBER 2025

MARKS: 150

TIME: $2^{1}/_{2}$ hour

This marking guideline consists of 10 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES SEPTEMBER 2025

1. **If more information than marks allocated is given**
   Stop marking when maximum marks are 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 is incorrect, do not credit. If sequence and links becomes correct again, resume credit.

9. **Non-recognised abbreviations**
   Accept if first defined in answer. If not defined, do not credit the unrecognized 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 recognizable 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

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.

SECTION A

QUESTION 1

1.1	1.1.1	C✓✓		
	1.1.2	C✓✓		
	1.1.3	A✓✓		
	1.1.4	A✓✓		
	1.1.5	B✓✓		
	1.1.6	B✓✓		
	1.1.7	C✓✓		
	1.1.8	C✓✓		
	1.1.9	A✓✓		
			(9 x 2)	**(18)**
1.2	1.2.1	Karyotype✓		
	1.2.2	Foramen magnum✓		
	1.2.3	Biogeography✓		
	1.2.4	Extinction✓		
	1.2.5	Haemophilia ✓		
	1.2.6	Bipedalism✓		
	1.2.7	Ribosome✓		
	1.2.8	Punctuated equilibrium✓		
	1.2.9	Interphase✓		
			(9 x 1)	**(9)**
1.3	1.3.1	A only✓✓		
	1.3.2	A only✓✓		
	1.3.3	Both A and B✓✓		
			(3 x 2)	**(6)**
1.4	1.4.1	(a) Prophase 1✓		(1)
		(b) Metaphase 2✓		(1)
	1.4.2	(a) A✓ Nuclear membrane✓		(2)
		(b) D ✓ Spindle fibre✓		(2)
	1.4.3	4✓/ four		(1)
	1.4.4	(a) Crossing over ✓		(1)
		(b) Metaphase 1✓		(1)
		(c) Ovary✓		(1)
				(10)
1.5	1.5.1	(a) Phylogenetic Tree✓		(1)
		(b) - *Australopithecus*✓ - *Homo*✓ **(Mark first TWO only)**		(2)
	1.5.2	1.4 mya✓ (accept range 1.4 – 1.5)		(1)
	1.5.3	1✓ million years (accept range 1 – 1.2)		(1)

1.5.4 (a) *Australopithecus afarensis*✓ (1)

(b) Hominidae✓ (1)
(7)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 2.1.1 Translation✓ (1)

2.1.2 (a) Peptide bond✓ (1)

(b) Amino acid✓ (1)

2.1.3 (a) codon✓ (1)

(b) AAT✓ (1)

2.1.4 (a) UCU✓ (1)

(b) - Leucine✓
- Glutamic acid✓
(Mark first TWO only) (2)
(8)

2.2
- The double helix DNA unwinds✓
- The double-stranded DNA unzips✓/weak hydrogen bonds break to form two separate strands.
- One strand is used as a template✓
- to form mRNA✓
- using free RNA nucleotides from the nucleoplasm✓
- The mRNA is complementary to DNA✓
- mRNA now has the coded message for protein synthesis✓ Any **(6)**

2.3 2.3.1
- A group of organisms of the same species✓
- occupying the same habitat✓
- at the same time✓ Any (2)

2.3.2 Timor monitors✓ (1)

2.3.3
- The original population of lizards/ common ancestor became separated by the geographical barrier✓ / oceans/ sea / river
- Then the population splits into two✓
- There was no gene flow between the two populations✓
- Each population experienced different environmental conditions✓/ the selective pressure may be different
- and therefore natural selection occur independently✓
- such that the individuals of the two populations became different✓
- genotypically and phenotypically✓
- Even if these two populations were to mix again✓
- they will not be able to interbreed✓
- forming the different species, Komodo dragon and Timor monitor ✓*

*Compulsory + 5 Any (6)
(9)

2.4 2.4.1 Both Q and S were at the crime scene✓✓

OR

They are identical twins✓✓ (2)

2.4.2
- Human error may occur✓
- Only a small amount of DNA was used✓and may not be reliable
- Framing✓/planting false evidence
- Suspect can have an identical twin✓ with the same DNA profile Any (2)

(Mark first TWO only)

2.4.3
- Paternity testing✓
- Establish compatible tissue types for organ transplant✓
- Identify relatives✓
- Find inherited disorders✓
- Develop cures for inherited disorders✓ Any (2)

(Mark first TWO only)

2.4.4
- DNA profile of each individual is unique✓
- except in the case of identical twins✓ (2)

(8)

2.5 2.5.1 2✓/ two (1)

2.5.2 $X^B X^b$✓ (1)

2.5.3
- Males only have one X chromosome✓/ XY
- and need only one recessive allele✓/ X^b
- to have Fabry disease✓
- There is no allele to mask the recessive one✓ Any (3)

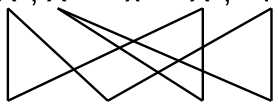
2.5.4 P1 Phenotype: Unaffected female x Unaffected male✓

Genotype: $X^B X^b$ x $X^B Y$✓

Meiosis

Gametes: X^B, X^b x X^B, Y ✓

Fertilisation



F.1 Genotype: $X^B X^B$, $X^B Y$, $X^B X^b$, $X^b Y$✓

Phenotype: Unaffected females, unaffected male, affected male✓*

P1 and F1✓

Meiosis and fertilisation ✓

OR

P.1 Phenotype: Unaffected female x Unaffected male✓

Genotype : $X^B X^b$ x $X^B Y$✓

Meiosis

Fertilisation

Gametes	X^B	Y
X^B	$X^B X^B$	$X^B Y$
X^b	$X^B X^b$	$X^b Y$

1 mark for correct gametes
1 mark for correct genotypes

F1 Phenotype: Unaffected females, unaffected male, affected male✓*

P_1 and F_1✓
Meiosis and fertilisation✓ (6)
***Compulsory mark** 1 + Any 5 **(11)**

2.6 2.6.1 B✓ (1)

2.6.2

T✓

C	D
Large canines✓/ teeth	Small canines✓/ teeth
Jaw / palate is U-shaped✓	Jaw /palate is C-shaped✓
Spaces between the teeth✓	No spaces between teeth✓

(Mark first TWO only) 1 mark for table + Any 4 (5)

2.6.3
- Changed from long and narrow to short and wide✓
- To support upper body weight✓
- in a bipedal organism✓ Any (2)

(8)
[50]

QUESTION 3

3.1 3.1.1 (a)
- Embryos ✓
- Bone marrow✓ (2)

(Mark first TWO only)

(b)
- Lymphoma ✓
- Leukaemia✓ (2)

(Mark first TWO only)

3.1.2
- Stem cells are undifferentiated✓
- and have the potential to develop into any type of cell✓
- to replace affected cells✓ / defective cells causing a disorder Any (2)

(6)

3.2 3.2.1 (a) No answer (6)

(b) - There was variation✓amongst the population of the moths
- some were light-coloured and others were dark-coloured✓
- When exposed to blackened trees✓
- the moths with light colour were visible to the predators and died✓
- Those with dark colour were camouflaged, survived✓
- and reproduced ✓
- passing the allele for the dark colour to their offspring✓
- The next generation had a higher proportion of moths with dark colour✓ Any (7)

(13)

3.3 3.3.1
- Decide on time to allow the mating of the two fish✓
- Decide on the sample size✓
- Decide on recording tool✓
- Decide on the time✓/ date/ session for sampling Any (2)

(Mark first TWO only)

3.3.2 (a) - 20 fish✓were collected
- Conducted over 5 years✓ (2)

(Mark first TWO only)

(b) - Same number of male fish in each species✓
- Only healthy fish were selected✓
- Same reproductive age✓ fish species Any (2)

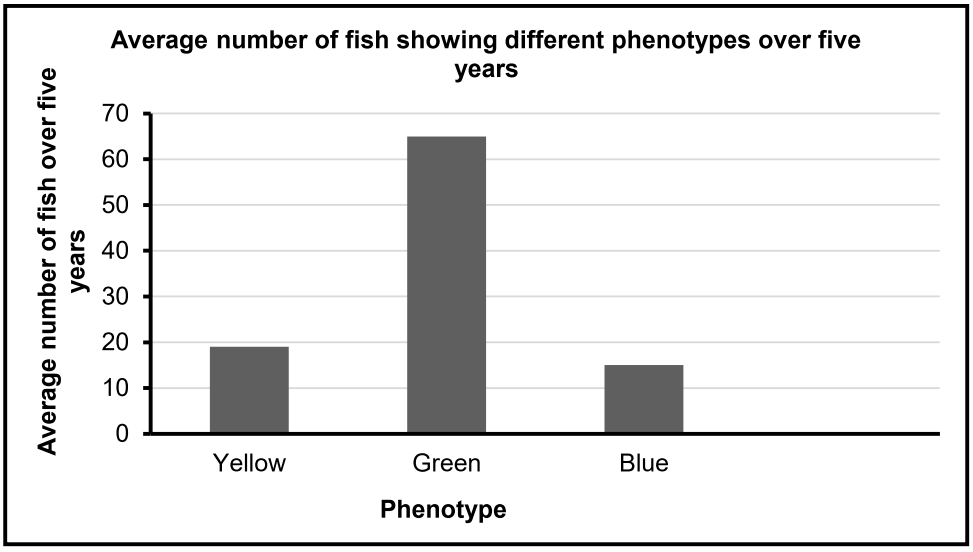
(Mark first TWO only)

3.3.3 Incomplete✓dominance (1)

3.3.4 - The offspring show a green colour which is an intermediate phenotype✓
- Neither allele for blue nor yellow colour is dominant over the other✓ (2)

3.3.5 - There was a greater chance of heterozygous green offspring✓
- being produced in each generation✓ (2)

3.3.6



Guideline for ASSESSING GRAPH

CRITERIA	MARK
Bar graph is drawn **(T)**	1
Caption of the graph includes both variables **(C)**	1
Correct labels on the X and Y axes with correct units **(L)**	1
Correct scale for X and Y-axes **(S)** equal space and width of bars	1
Plotting of co-ordinates **(P)** correctly: 1 to 2 All 3 co-ordinates plotted correctly	1 2

(6)
(17)

3.4
- Homologous chromosome pair/ chromosomes on position 21 fail to separate✓
- during Anaphase I✓/ II
- Gamete will have an extra chromosome✓/ 24 chromosomes
- When this gamete is fertilised by a normal gamete✓with 23 chromosomes
- the zygote will have 47 chromosomes✓/extra chromosomes on pair 21/Trisomy 21 **(5)**

3.5 3.5.1 Dihybrid✓cross (1)

3.5.2 Two characteristics/ pairs of alleles are crossed✓ (1)

3.5.3 (a) - RrBb✓
- Rrbb✓ (2)

(b) - Rb✓
- rb ✓ (2)

(c) 3:1✓✓ (2)

3.5.4 0✓
OR
4✓/ all (1)
(9)

CONVERSION TABLE FOR 1.1	
CANDIDATE MARK	**ADJUSTMENT**
1 – 3	No mark (0)
4 – 11	+1 mark
12 – 19	+ 2 marks
20 – 25	+ 3 marks
26 – 33	+ 4 marks
34 – 40	+ 5 marks
41 - 44	+ 6 marks

TOTAL SECTION B: 100

GRAND TOTAL: 150