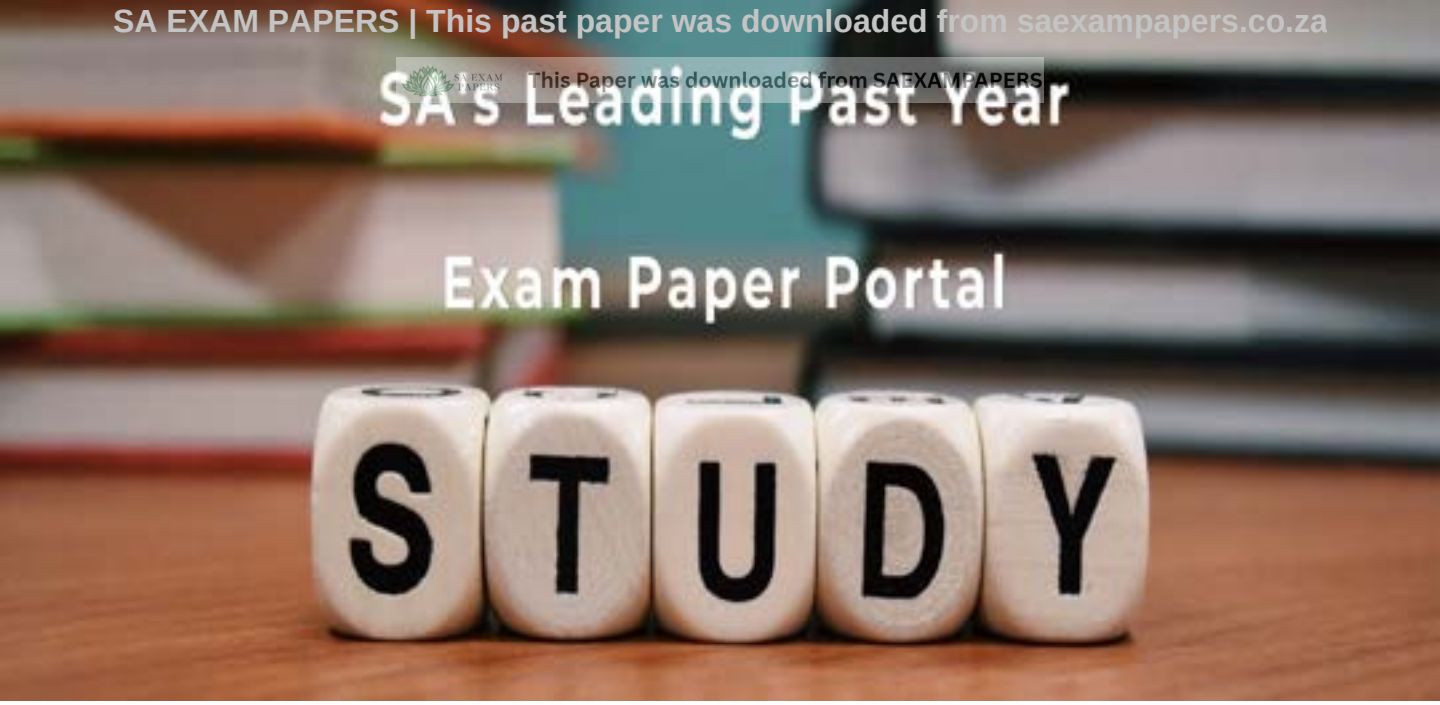


education

MPUMALANGA PROVINCE

REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P2

SEPTEMBER 2025

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 13 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

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 a 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 annotation 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 become correct again, resume credit.

9. **Non-recognised 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 the answer provided it does not mean something else in Life Sciences or if it is out of context.

13. **If common names are given in terminology**
    Accept provided it is accepted at the provincial memo discussion meeting

14. **If only letter is asked for and only name is given (and vice versa)**
    Do not 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.

19. **Changes**
    No changes must be made to the marking guidelines without consulting the Provincial Internal Moderator.

SECTION A

QUESTION 1

1.1	1.1.1	B✓✓		
	1.1.2	C✓✓		
	1.1.3	A✓✓		
	1.1.4	D✓✓		
	1.1.5	C✓✓		
	1.1.6	B✓✓		
	1.1.7	B✓✓		
	1.1.8	D✓✓		
	1.1.9	B✓✓		
	1.1.10	C✓✓		**(20)**
1.2	1.2.1	Ribose✓sugar		
	1.2.2	Peptide✓bond		
	1.2.3	Interphase✓		
	1.2.4	Cytokinesis✓		
	1.2.5	Colour blindness✓		
	1.2.6	Codominance✓		
	1.2.7	Genome✓		
	1.2.8	Cultural✓ evidence		
	1.2.9	Cradle of human kind✓		
	1.2.10	Prognathism✓	(10 x 1)	**(10)**
1.3	1.3.1	None✓✓		
	1.3.2	Both A and B✓✓		
	1.3.3	A only✓✓	(3 x 2)	**(6)**
1.4	1.4.1	Out of Africa✓ hypothesis		(1)
	1.4.2	In Africa✓		(1)
	1.4.3	*Homo erectus*✓		(1)
	1.4.4	40 000 years ago✓		(1)
	1.4.5	South America✓		(1)
	1.4.6	Ardipithecus✓ Australopithecus✓	Any order	(2) **(7)**

1.5	1.5.1	Rrgg✓✓ rrGg✓✓	(4)
	1.5.2	(a) black eyes✓ and white feathers✓	(2)
		(b) rG rg ✓	(1)
			(7)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

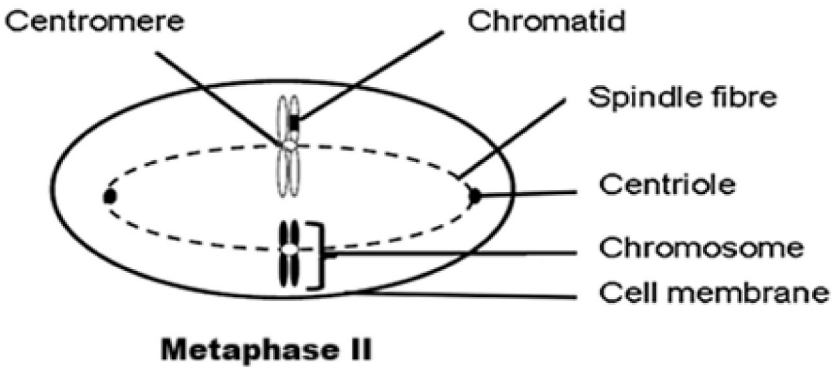
2.1	2.1.1	Allows the mRNA to move out of the nucleus to the cytoplasm✓	(1)
	2.1.2	A part of a DNA molecule that acts as a pattern for the building of mRNA✓/another DNA molecule **OR** The part of DNA that codes for a protein✓	(1)
	2.1.3	CGT✓	(1)
	2.1.4	- Process A is **transcription** taking place in the nucleus✓ - Process B is **translation** taking place in the cytoplasm✓ - Process A/**Transcription** produces mRNA✓ - Process B/**Translation** produces amino acid chain/polypeptide/protein✓ - Process A/**Transcription** starts with DNA✓ - Process B/**Translation** starts with mRNA✓ - Process A/**Transcription** does not use tRNA✓ - Process B/**Translation** use tRNA✓ - Process A/**Transcription** there are no amino acids joined together by peptide bond✓ - Process B/**Translation** amino acids are joined together buy peptide bond✓ **(Mark first TWO only)** Any (2 x 2)	(4)
	2.1.5	(a) Alanine✓ (b) Phenylalanine✓	(1) (1)
	2.1.6	- The codon ACA changed to AGA✓ - The anticodon/tRNA sequence UGU changed to UCU✓ - Both anticodons UCU and UGU code for the same amino acid cysteine✓ - thus, the type of protein formed will not change/remain the same✓	(4) **(13)**

2.2	2.2.1	DNA profiling✓		(1)
	2.2.2	Suspect 2✓		(1)
	2.2.3	- Eight/all of the DNA profile bands from suspect 2 are identical✓to the DNA profile bands from the hair✓		(2)
	2.2.4	The DNA from the hair and from the skin shows completely different banding patterns✓✓/the bands for hair and the skin are not the same		(2)
	2.2.5	- Proof of paternity✓ - Finding long lost relatives✓/tracing missing persons - Establishing family relations✓ - Identifying dead bodies✓/person/animals/organisms - Identifying fossils✓ - Identification/diagnosing of genetic disorders✓/genetic counselling - Finding matching tissues for organ transplants✓ **(Mark first TWO only)**	Any 2	(2) **(8)**

2.3 2.3.1 Metaphase I✓ (1)

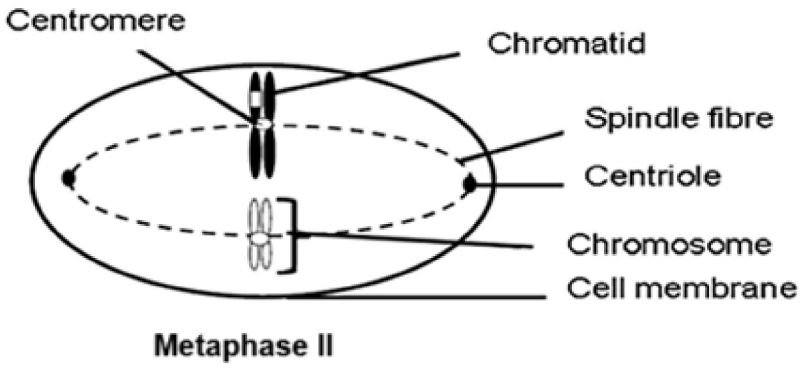
2.3.2 Anaphase I/meiosis I – Homologous chromosome pairs separate✓/ Chromosomes move to opposite poles
Anaphase II/ meiosis II – Chromosomes separate✓/ Chromatids move to opposite poles (2)

2.3.3



Metaphase II

OR



Metaphase II

Description	Mark allocation
Caption (**C**)	1
TWO chromosomes drawn at the equator (**D**)	1
Shading, shape and size of chromosomes (**S**)	1
Any ONE correct label (**L**)	1

(4)
(7)

2.4	2.4.1	Male✓	(1)
	2.4.2	No✓	(1)
	2.4.3	It has 39 chromosome pairs✓ instead of 23 chromosome pairs✓/ it has 78 chromosomes instead of 46	(2)
	2.4.4	**Chromosomal✓***/chromosome mutation - There is a change in the number of chromosomes✓ - There is only ONE chromosome✓/ one less chromosome/ one chromosome short - Instead of two✓ - on chromosome pair number 6✓/six *__Compulsory__ + Any 3	(4) **(8)**
2.5	2.5.1	- Embryo✓ - Umbilical cord✓ - Bone marrow✓ **(Mark first ONE only)** Any 1	(1)
	2.5.2	- Stem cells are undifferentiated✓ - and have the potential to develop into any type of cell✓ - te replace affected/defective cells causing a disorder✓	(3)
	2.5.3	- Cells have the same DNA/genes✓/alleles - same antigens✓/tissue type/blood group - less risk of rejection✓/not rejected - no immune response by immune system✓/no need to take immunosuppressants✓ - No risk of infection/disease spread✓ **(Mark first TWO only)** Any 2	(2) **(6)**
2.6	2.6.1	2✓/Two	(1)
	2.6.2	- Both alleles of a gene are equally dominant✓ - whereby both alleles express themselves in the phenotype in the heterozygous condition✓	(2)
	2.6.3	- The man has an allele for blood group A✓/ is I^AI^B - The woman is heterozygous✓/ is I^Bi for blood group B - The child inherits the I^A✓/dominant allele from the father - and the i✓/recessive i from the mother - Therefore, the child will be heterozygous✓ for blood group A/the genotype will be I^Ai/the genotype I^A masks i	(5) **(8)**

QUESTION 3

3.1 3.1.1
- A form of a gene✓
- that is carried on chromosome 1-22✓ and
- is always expressed in the phenotype✓ of an individual
- in the homozygous dominant or heterozygous✓ condition

Any 2 (2)

3.1.2
- The couples had already reproduced children✓
- Before symptoms appear✓/before knowing they have the disease/do not know have the disease
- because it is hard to diagnose before symptoms appear✓ Any 2 (2)

3.1.3 P_1 Phenotype Man with Machado- Joseph x Woman without Machado-Joseph✓

Genotype Dd x dd✓

Meiosis

G/Gametes D , d x d , d✓

Fertilisation

F_1 Genotype Dd, Dd, dd, dd✓

Phenotype 2 with Machado-Joseph; 2 without Machado-Joseph
50% with Machado-Joseph✓*

P_1 and F_1✓
Meiosis and fertilisation✓ ***compulsory + Any 5**

OR

P_1 Phenotype Man with Machado-Joseph x Woman without Machado - Joseph✓

Genotype Dd x dd✓

Meiosis

Fertilisation

Gametes	d	d
D	Dd	Dd
d	dd	Dd
1 mark for correct gametes 1 mark for correct genotype		

F_1 Phenotype 2 with Machado-Joseph; 2 without Machado-Joseph
50% with Machado-Joseph✓*

P_1 and F_1✓
Meiosis and fertilisation✓ ***compulsory + Any 5** (6)
(10)

3.2 3.2.1
- They cut out the gene from bacterial✓ /DNA/plasmid
- inserted into✓ /transfer gene to the chromosome/DNA of mosquito
- to produce/create the genetically modified (GM) male mosquitoes✓ (3)

3.2.2
- Anopheles mosquito die out without the use of insecticides✓
- Fewer mosquitoes biting or spreading Malaria✓
- Fewer people get/die from Malaria✓
- Lower medical costs✓ /less health care needed
- Better economically for developing✓/tropical countries

(Mark first ONE only) Any 1 (1)

3.2.3
- Cloning: process of making (genetically) identical organisms✓
- Genetic engineering: process whereby genes coding for the desired characteristic are inserted into an organism✓ (2)

(6)

3.3 3.3.1 Pangea✓ (1)

3.3.2
- The common ancestor *Panthera "leo* became separated due to continental drift✓/ by oceans
- onto Gondwanaland and Laurasia✓*
- they split into four groups/populations✓
- There is now no gene flow✓ between the four populations.
- Since each population may be exposed to different environmental conditions✓/the selection pressure may be different
- natural selection occurs independently✓ in each of the four populations
- such that the individuals of the four populations become very different✓ from each other
- genotypically and phenotypically✓.
- Even if the four populations were to mix again ✓ they will not be able to interbreed✓
- The four populations are now different species namely *Paranthera leo, Paranthera spelaea, Paranthera vereshchigini, Paranthera afrox*✓* (7)

*** 2 compulsary + any 5**

(8)

3.4	3.4.1	Plant adaptation to different pollinators✓		(1)
	3.4.2	- Breeding at different times of the year✓ - Species-specific courtship behaviour✓ - Infertile offspring✓ - Prevention of fertilisation✓ **(Mark first TWO only)**	Any 2	(2)
	3.4.3	Punctuated equilibrium✓		(1)
	3.4.4	- Evolution involves long periods of time where species do not change✓ or change gradually through natural selection (known as equilibrium). - This alternates with (is punctuated by) short periods of time where rapid changes occur✓ through natural selection - during which new species may form in a short period of time.✓	Any 2	(2) **(6)**
3.5	3.5.1	Is having ADHD advantages for foraging?✓✓ **OR** Does ADHD have an effect on foraging?✓✓ **OR** What effect does ADHD have on foraging?✓✓		(2)
	3.5.2	- Obtain informed consent/permission from participants✓ - Decide on sample size to be used✓ - Decide on recruiting method✓ - How will ADHD information be obtained from participants✓ **(Mark first TWO only)**	Any 2	(2)
	3.5.3	506 x $\frac{43}{100}$ ✓ = 217,58 Thus 218✓ participants **OR** 506 x 43%✓ = 217,58 Thus 218 ✓participants		(2)

3.5.4

Number of berries collected by different groups of participants	
Groups of participants	**Number of berries gathered**
With ADHD	602
Without ADHD	521

Description	Mark allocation
Caption - results representing both variables (**C**)	1
Table drawn (**T**)	1
Labels - Rows =independent Colom = dependent (**L**)	1
Data - correct data captured for each independent (**D**)	2

(5)

3.5.5 Bar✓ graph/ pie chart (1)

(12)

3.6 3.6.1 *Australopithecus✓ afarensis✓* (2)

3.6.2 Ethiopia✓ (1)

3.6.3 Bipedalism✓/ Bipedal (1)

3.6.4
- Foramen magnum is in a more forward position✓
- S-shaped vertebral column✓
- Short and wide pelvis✓
- Longer legs than arms✓/ shorter arms than legs
- Strong knee joints✓
- Feet arched✓

(Mark first THREE only) Any 3 (3)

3.6.5 *Homo erectus✓* (1)

(8)
[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150