education

MPUMALANGA PROVINCE

REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES

JUNE 2025

MARKING GUIDELINES(AMENDED)

MARKS: 150

These marking guidelines consists of 12 pages.

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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.

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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.

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	A✓✓
	1.1.2	C✓✓
	1.1.3	C✓✓
	1.1.4	C✓✓
	1.1.5	A✓✓
	1.1.6	B✓✓
	1.1.7	A✓✓
	1.1.8	D✓✓
	1.1.9	A✓✓
	1.1.10	B✓✓

(20)

1.2	1.2.1	Gene✓ mutation
	1.2.2	Ribose✓ sugar
	1.2.3	Crossing over✓
	1.2.4	Amnion ✓
	1.2.5	Testes✓/ testis
	1.2.6	Ovarian cycle✓
	1.2.7	Sex-linked✓ inheritance
	1.2.8	Multiple sclerosis✓
	1.2.9	Choroid ✓

(9)

1.3	1.3.1	A only✓✓
	1.3.2	A only✓✓
	1.3.3	B only✓✓

(6)

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1.4	1.4.1	A- Jelly layer✓ C- Cytoplasm✓ E- Tail✓		(3)
	1.4.2	Contains genetic material✓/ DNA		(1)
	1.4.3	It contains the mitochondrion✓ which provides energy✓ for the movement of the spermatozoa		(2)
	1.4.4	- both are produces through the process of meiosis✓ - both contain a nucleus✓ - both contain cytoplasm✓ - both are haploid cells✓ - they are both gametes✓ **(Mark first ONE only)**	Any 1	(1) **(7)**
1.5	1.5.1	X- TSH ✓(Thyroid stimulating hormone) Y- Thyroxin✓		(2)
	1.5.2	At the base of the brain attached to the hypothalamus✓		(1)
	1.5.3	The pituitary gland secretes more TSH✓, which stimulates the thyroid gland to secrete more thyroxin✓/ hormone		(2)
	1.5.4	The person will: - loose weight✓ - remain tired✓ - increase heart rate✓	Any 2	(2)
	1.5.5	- Growth hormone✓ (GH) - Follicle stimulating hormone✓ (FSH) - Luteinizing hormone✓ (LH) - Prolactin✓ **(Mark first ONE only)**	Any 1	(1) **(8)**

TOTAL SECTION A: [50]

SECTION B

QUESTION 2

2.1 2.1.1 (a) FSH✓/Follicle stimulating hormone (1)

(b) LH✓/Luteinising hormone (1)

2.1.2 23✓ (1)

2.1.3 - The levels of progesterone drop✓
- therefore FSH secretion is no longer inhibited✓/is secreted
- and a new follicle starts to develop✓ (3)

2.1.4 - No follicle will develop✓
- No oestrogen is produced✓
- No development of corpus luteum✓
- and no progesterone is produced✓
- Therefore, the endometrium will not develop✓/thicken to be shed during menstruation (4)

2.1.5 Pituitary gland✓* / Hypophysis
- It secretes FSH✓
- which stimulates the growth and development✓
- Of the primary follicle to Graafian follicle✓

1* compulsory + any 2 (3)
(13)

2.2 2.2.1 Internal✓ (1)

2.2.2 a) Ovoviviparous✓ (1)

b) Viviparous✓ (1)

2.2.3 Organisms lay eggs outside the female body✓ (1)

2.2.4 - The eggs/embryos grows to full development inside the female body✓
- A larger body give more space to hold the embryo/eggs✓ (2)
(6)

2.3 2.3.1 Transcription✓ (1)

2.3.2 Contains/gives the code for protein synthesis✓ (1)

2.3.3 UAA✓ (1)

2.3.4 **Translation✓***
- Each tRNA carries a specific amino acid✓
- When the anticodon on the tRNA✓
- matches the codon on the mRNA✓
- then tRNA brings the required amino acid to the ribosome✓
- Amino acids become attached to each other by peptide bonds✓
- to form the required protein✓ (5)

1* Compulsory + any 4

2.3.5 - The sequence of nitrogenous bases changes✓ in molecule Y/ DNA
- the sequence of codons on mRNA/ molecule D changes✓
- tRNA brings the amino acids✓
- Sequence of amino acids changes✓
- forming a different protein✓
- with a different function✓ /dysfunctional Any 3 (3)

2.3.6 - they both exist as polymers/ large molecules known as nucleic acids✓
- they are both made up of monomers known as nucleotides✓
- they both have phosphate group✓
- they both have the nitrogenous bases, adenine, cytosine and guanine ✓

Any 2 (2)

(13)

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2.4 2.4.1 a) Interphase✓ (1)

b) Mitosis✓ (1)

c) Cell division C✓ (1)

2.4.2
- Produce (haploid) gametes✓
- The halving effect of meiosis overcomes the doubling effect of fertilization✓
- Maintains the chromosome number✓
- Introduce genetic variation✓ Any 2 (2)

2.4.3 Hair✓/ bones/ skin
Any body cell/structure other than gonads Any 1 (1)

2.4.4
- Crossing over
- Homologous chromosomes pair up✓/lie next to one another
- (Non-sister/ adjacent) chromatids overlap✓
- at the point known as chiasma✓
- and exchange genetic material✓
- Chromosomes now contains a combination of one another's genetic material✓ Any 4 (4)

2.4.5
- Cell division B - genetically identical cells/diploid cells are formed✓
- Cell division C - non-identical cells/ haploid cells formed✓ (2)

(12)

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2.5

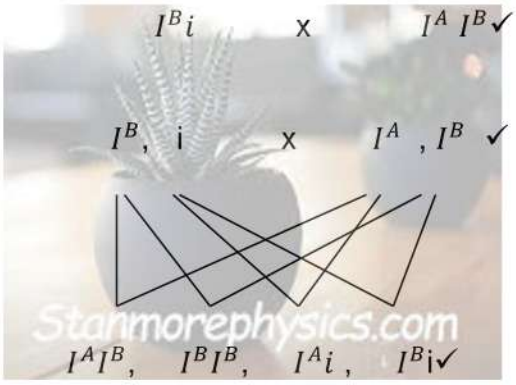
P1 Phenotype Blood group B x Blood group AB✓

Genotype $I^B i$ x $I^A I^B$✓

Meiosis

G/gametes I^B, i x I^A , I^B ✓

Fertilisation



F1 Genotype $I^A I^B$, $I^B I^B$, $I^A i$, I^Bi✓

Phenotype Blood group AB; Blood group B; Blood group A; Blood group B✓

Percentage: ***25%✓ chance of having an A child**

P1 and F1✓

Meiosis and fertilization✓ ***** Compulsory 1 + Any 5**

OR

P1 Phenotype Blood group B x Blood group AB ✓

Genotype $I^B i$ x $I^A I^B$✓

Meiosis

Fertilisation

Gametes	I^B	i
I^A	$I^A I^B$	$I^A i$
I^B	$I^B I^B$✓	I^B✓i

1 mark for correct gametes
1 mark for correct genotypes

F1 Genotype $I^A I^B$, $I^B I^B$, $I^A i$, I^Bi✓

Phenotype AB; B; A; B✓

Percentage: ***25% ✓chance of having A child**

P1 and F1✓

Meiosis and fertilization✓ ***** Compulsory 1 + Any 5** **(6)**

TOTAL QUESTION 2 **[50]**

QUESTION 3

3.1 3.1.1 Pedigree✓ diagram (1)

3.1.2 4✓/ Four (1)

3.1.3 X^FX^f✓✓ (2)

3.1.4 Male with FXS✓✓ (2)

3.1.5 Recessive✓ (1)

3.1.6
- Individual 9 has FXS✓
- His genotype must be X^fY✓
- Which means he got a Y chromosome from individual 3✓/his father
- And X^f from individual 4✓/his mother
- Since individual 4 is a female without FXS✓
- She has a dominant X✓/ X^F/ X^FX^f
- That masks the recessive X^f✓

Any 4 (4)

(11)

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3.2 3.2.1 Biotechnology✓/Genetic engineering (1)

3.2.2
- Extract a human insulin gene✓
- Place the human gene into a cut bacteria plasmid✓
- To form recombinant DNA✓
- Insert back into bacteria to reproduce✓
- Extract insulin produced✓

Any 4 (4)

3.2.3 Eliminates the need for injections✓ (1)

3.2.4 It lowers the chances of rejection✓/ no need for anti-rejection medication (1)

3.2.5
- Stem cells are undifferentiated✓/ can become any other cell
- They are stimulated to become islet cells✓/ beta cells/pancreatic cells
- That can produce insulin✓ (3)

(10)

3.3 3.3.1 Cornea✓ (1)

3.3.2 A✓ - Vitreous humour✓ (2)

3.3.3
- Transparent✓ - allows light to enter the eye✓
- Elastic✓ - change shape during accommodation/ for distant vision✓

(2)

(Mark first ONE only) Any 1 x 2

3.3.4 B- contains rods and cones✓/photoreceptors
C- does not contain photoreceptors✓/ contains the optic nerve (2)

3.3.5
- The circular muscles are relaxed✓
- The radial muscles are contracted✓

(2)
(9)

3.4
- Pinna traps and directs sound waves into auditory canal✓
- Sound waves carried over to tympanic membrane (ear drum) causing it to vibrate✓
- Cause ossicles to vibrate✓
- Ossicles causes oval window to vibrate✓
- Creates fluid pressure waves in endolymph (and perilymph) of Cochlea✓
- Organ of Corti in Cochlea get stimulated ✓
- Hair cells in organ of Corti converts stimulus into nerve impulse✓
- Nerve impulse carried by auditory nerve to cerebrum where sound is interpreted✓
- Pressure released out the round window to Eustachian tube✓

Any 7 **(7)**

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3.5 3.5.1 Sensory✓ neuron (1)

3.5.2 a) (Various) body parts✓ (1)

b) Two-part threshold✓ (1)

3.5.3
- 10 participants were used✓
- They took the average of the results✓ (2)

3.5.4 The finger tips contains more receptors than the fore arms and back✓✓

OR

The back contains less receptors than the fore arms and finger tips✓✓

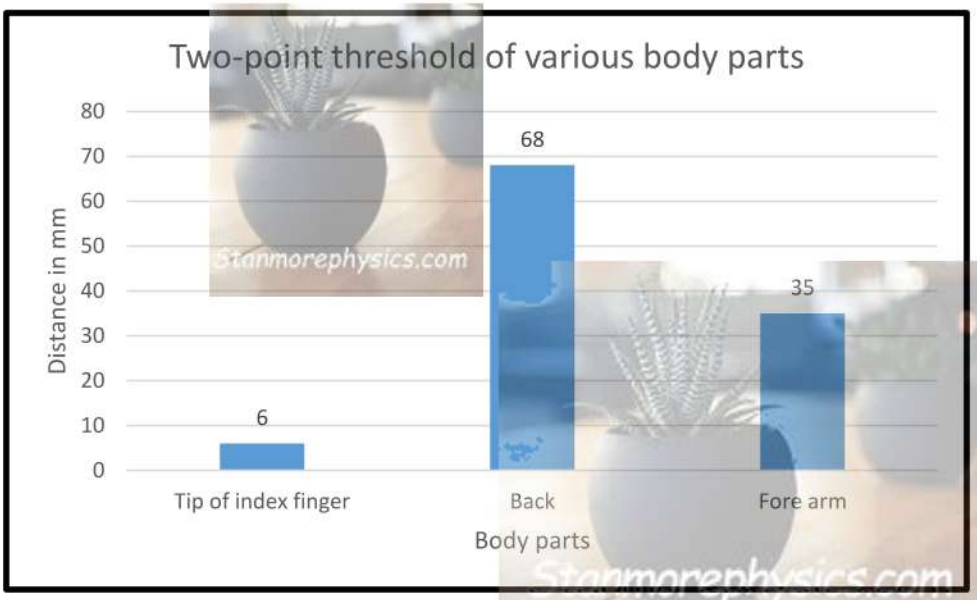
OR

The finger tips has the most receptors✓✓

OR

The back has the least receptors✓✓ (2)

3.5.5



Description	Mark allocation
Caption with both variables (**C**)	1
Bar graph drawn (**T**)	1
Both x and y-axis labeled (**L**)	1
Correct scaling of y-axis and bars (**S**)	1
Plotting of bars (P)	(1 – 2 bars drawn correctly) 1 (all three bars drawn correctly) 2

(6)

(13)

TOTAL QUESTION 3 [50]
TOTAL SECTION B: 100
GRAND TOTAL: 150

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