FINAL

KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

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LIFE SCIENCES

JUNE EXAMINATION 2025

MARKING GUIDELINE

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MARKS: 150

This memorandum consists of 8 pages

PRINCIPLES RELATED TO MARKING LIFE SCIENCES SEPTEMBER 2024

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

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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.



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SECTION A

QUESTION 1

1.1	1.1.1	C✓✓		
	1.1.2	D✓✓		
	1.1.3	B✓✓		
	1.1.4	D✓✓		
	1.1.5	C✓✓		
	1.1.6	A✓✓		
	1.1.7	C✓✓		
	1.1.8	A✓✓		
	1.1.9	D✓✓	(9 x 2)	**(18)**
1.2	1.2.1	Gonosome✓		
	1.2.2	Umbilical vein✓		
	1.2.3	Karyokinesis✓		
	1.2.4	Endometrium✓		
	1.2.5	Peptide✓bond		
	1.2.6	Hormones✓		
	1.2.7	Gestation✓	(7 x1)	**(7)**
1.3	1.3.1	A only✓✓		
	1.3.2	A only✓✓		
	1.3.3	None✓✓	(3 x 2)	**(6)**
1.4	1.4.1	Dihybrid✓		(1)
	1.4.2	(a) Big and green fruit✓		(1)
		(b) - Bg✓ - bg✓		(2)
	1.4.3	0✓✓%		(2)
	1.4.4	BBgg ✓✓ bbgg		
		OR BBgg ✓✓ BBgg		
		OR BBgg ✓✓ Bbgg		(2) **(8)**
1.5	1.5.1	(a) B✓		(1)
		(b) A✓		(1)
		(c) B✓		(1)
		(d) C✓		(1)
	1.5.2	Amniotic✓ egg		(1) **(5)**

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1.6 1.6.1 (a) Ovulation✓ (1)
(b) Graafian follicle✓ (1)

1.6.2 (a) Progesterone✓ (1)
(b) Oestrogen✓ (1)
(c) Luteinizing hormone✓/ LH (1)
(d) Follicle stimulating hormone✓ / FSH (1)
(6)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1.1 Protein✓/peptide (1)

2.1.2 Ribosome✓ (1)

2.1.3 Five✓ / 5 (1)

2.1.4 - Copies the coded information from DNA molecule✓
- to the ribosomes✓/ for the arrangement of amino acids (2)

2.1.5 CCU✓ (1)

2.1.6 (a) CGC✓ (1)

(b) Glutamine✓ (1)

(c) - mRNA codon changed from GAG to GUG✓
- leading to (tRNA) anticodon changing from CUC to CAC✓
- bringing valine instead of glutamine✓
- resulting in the formation of a different protein✓ (4)
(12)

2.2 - Transcription✓*
- The DNA double helix unwinds✓
- Weak hydrogen bonds break between the strands✓/ strands unzips to form two separate strands
- One strand is used as the template✓
- to form mRNA✓
- using free RNA nucleotides✓ from the nucleoplasm
- The mRNA is complementary to the DNA✓
- mRNA now has the coded message for protein synthesis✓

Compulsory✓* + Any 6 **(7)**

2.3 2.3.1 Chromosomes that:
- Are identical in size✓/length
- Are identical in shape✓
- Have genes that code for the same characteristic occupying the same locus✓
- Have centromere in the same position✓ Any (1)

(Mark first ONE only)

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2.3.2 Crossing over✓ (1)

2.3.3 Prophase I✓ (1)

2.3.4
- Produce gametes✓
- Ensure variation✓ / exchange of genetic variation

(Mark first TWO only) (2)

2.3.5 Failure of chromosomes / chromatids to separate✓ during anaphase (1)

2.3.6
- Failure of chromosomes pair 21 to separate during anaphase I✓/ II
- results in a gamete with an extra copy of chromosome 21✓
- When it fuses with a normal gamete,✓
- a zygote with 47 chromosomes✓ will be formed

Any (3)
(9)

2.4 P_1

Phenotype: Non-haemophilic female x Haemophiliac ✓ male

Genotype: X^HX^h x X^hY✓

Meiosis

Gametes: X^H, X^h x X^h, Y✓

Fertilisation

F_1 *generation* Genotype: X^HX^h, X^HY X^hX^h, X^hY✓

Phenotype: non-haemophilic daughter; non-haemophilic son haemophiliac daughter: daughter; haemophiliac son✓

Phenotypic ratio: 1:1:1:1✓*

P_1 and F_1✓

Meiosis and fertilisation✓

Compulsory mark 1* + Any 5

OR

P_1

Phenotype: Non-haemophilic female x Haemophiliac ✓ male

Genotype: X^HX^h x X^hY ✓

Meiosis

Fertilisation

F_1 *generation*

Gametes	X^H	X^h
X^h	X^HX^h	X^hX^h
Y	X^HY	X^hY

1 mark for correct gametes
1 mark for correct genotypes

Phenotype: non-haemophilic daughter; non-haemophilic son haemophiliac daughter: daughter; haemophiliac son✓

Phenotypic ratio: 1:1:1:1✓*

P_1 and F_1✓

Meiosis and fertilisation✓

Compulsory mark 1* + Any 5 **(6)**

2.5 2.5.1 Three✓ / 3 (1)

2.5.2 (a) I^Bi✓ (1)

(b) I^Ai✓ (1)

2.5.3 2✓ (1)

2.5.4
- The genotype of child 2 is ii✓
- For the children, the mother can contribute either the I^B or i✓
- and the father can contribute either the I^A or I^B✓ (3)

(7)

2.6 2.6.1 Pedigree✓ diagram (1)

2.6.2 Male with Gaucher disease✓ (1)

2.6.3 (a) THREE✓ / 3 (1)

(b) THREE✓ / 3 (1)

2.6.4 Gg✓ (1)

2.6.5
- Individual 6 does not have Gaucher disease✓
- but has a child / individual 7 with Gaucher disease✓
- who is homozygous recessive✓ / **gg**
- and inherited the recessive allele / **g** from each parent✓
- Therefore, individuals 5 and 6 are heterozygous✓/ **Gg** Any (4)

(9)

QUESTION 3

3.1 3.1.1 (a) Seminal vesicle✓ (1)

(b) Urethra✓ (1)

3.1.2 Store sperm✓ cells (1)

3.1.3
- Spermatogenesis✓* (1)
- Under the influence of testosterone✓
- Diploid cells in the seminiferous tubules✓ of the testes
- undergo meiosis✓
- to form haploid sperm cells✓ Compulsory mark 1* + 4 (5)

3.1.4
- The other vas deferens is still functional✓
- and will be able to transport semen✓/ sperm cells to the urethra
- and deposited to the vagina to fertilise egg✓ in the oviduct (3)

(11)

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3.2
- The zygote divides by mitosis✓ several times
- to form a (solid) ball of cells✓
- called morula✓
- which further divides to form a hollow ball of cells✓
- called blastula✓/ blastocyst Any **(4)**

3.3 3.3.1 Thyroxin✓ (1)

3.3.2 ✓

Hypothyroidism	Hyperthyroidism
- occurs when the thyroid gland does not produce enough hormone✓	- occurs when the thyroid gland produces too much thyroid hormone✓

1 mark for the table + (1 x 2) (3)

3.3.3 (a)
- Low thyroxin levels in the blood✓
- Stimulates the pituitary gland✓
- to secrete more TSH✓/ high levels of TSH (3)

(b)
- Since the thyroxin levels remain high✓
- The rate of metabolism will remain high✓
- More glucose will be used✓ / broken down
- Glucose /fats decrease✓in the blood Any (3)

(10)

3.4 3.4.1 Cochlea✓ (1)

3.4.2 (a) Cerebellum✓ (1)

(b) Cristae✓ (1)

(c) Change in the speed and direction of movement of the head✓ (1)

3.4.3
- Nerve impulses will not be transmitted✓to the cerebellum
- Therefore, no nerve impulses will be sent to the muscles✓
- and no coordination/ balance occur✓ (3)

(7)

3.5
- Circular muscles will relax✓
- Radial muscles contract✓
- Pupil dilates✓
- and more light enters the eye✓ **(4)**

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3.6 3.6.1 A change in the environment✓of an organism (1)

3.6.2 (a) Gender✓ (1)

(b) Reaction time✓ (1)

(c)
- Both learners were of the same age✓
- Both learners were Athletes✓

(Mark the first TWO only) (2)

3.6.3 - To ensure that the gender is the only variable that influences the reaction time✓✓ (2)

3.6.4 Sample size was too small✓ / only 1 male and female were used (1)

3.6.5 Average reaction time = $\frac{0.10 + 0.098 + 0.10 + 0.095 + 0.093}{5}$ ✓

= 0.1✓ (2)

3.6.6 Males have less reaction time than females✓✓/ females have more reaction time than males (2)

3.6.7 - a person can brake faster✓/ respond faster
- to prevent accident✓ (2)

(14)
[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150

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