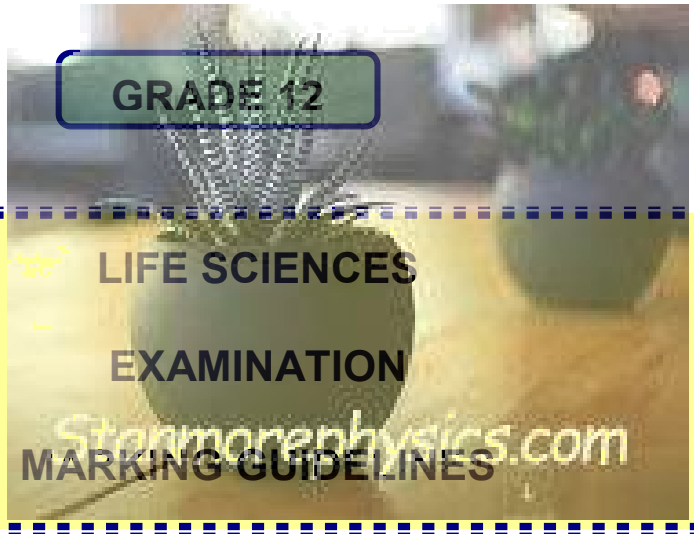
FINAL!!!

KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE



MARKS: 150

This Marking Guidelines consists of 8 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 the relevant part.

4. **If comparisons are asked for, but descriptions are given**
   Accept if the 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 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 the 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 was accepted at the national memo discussion meeting.

14. **If only the letter is asked for, but only the 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.

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SECTION A

QUESTION 1

1.1	1.1.1	B✓✓		
	1.1.2	B✓✓		
	1.1.3	C✓✓		
	1.1.4	D✓✓		
	1.1.5	C✓✓		
	1.1.6	B✓✓		
	1.1.7	C✓✓		
	1.1.8	D✓✓		
	1.1.9	B✓✓		
	1.1.10	C✓✓	(10 x 2)	**(20)**
1.2	1.2.1	Hypothalamus✓		
	1.2.2	Prolactin✓		
	1.2.3	Chorion✓		
	1.2.4	Progesterone✓		
	1.2.5	Allantois✓		
	1.2.6	Haemophilia✓		
	1.2.7	Allele✓		
	1.2.8	Genome✓		
	1.2.9	Sympathetic✓		
	2.1.10	Multiple Sclerosis✓	(10 x 2)	**(10)**
1.3	1.3.1	B only✓✓		(2)
	1.3.2	None✓✓		(2)
	1.3.3	Both A and B✓✓		(2)
				(6)
1.4	1.4.1	Dihybrid✓ cross		
	1.4.2	(a) 3✓		(1)
		(b) 1✓		(1)
	1.4.3	Triangular wings with white eyes✓		(1)
	1.4.4	9 Triangular wings-red eyes: 3 Triangular wings-white eyes: 3 Oval wings-red eyes: 1 Oval wings-white eyes. ✓✓		(2)
	1.4.5	tR✓/ Rt		(1)
				(7)

1.5 1.5.1 (a) Sensory✓ neuron (1)

(b) Synapse✓ (1)

1.5.2 C✓ - Effector muscle✓ (2)

1.5.3 Transmits impulses from the sensory to the motor neurons/ connects a sensory neuron to a motor neuron✓ (1)
(Mark the FIRST one only)

1.5.4 There will be no reaction to the stimulus✓ (1)
(Mark FIRST one only)

1.5.5 - transmits impulses from receptors to the brain and from the brain to the effectors✓
- contains reflex centres that function automatically to protect the body✓ (1)
(Mark the FIRST one only) **(7)**
[50]

SECTION B

QUESTION 2

2.1 2.1.1 (a) Translation✓ (1)

(b) tRNA✓ (1)

(c) Codon✓ (1)

2.1.2 GAG✓✓ (2)

2.1.3 - molecule S brings the required/specific amino acid✓
- to the ribosome✓ (2)

2.1.4 - the mRNA codon AUA will change into CUA✓
- and codon GCC will change into UCC✓.
- which will change anticodons UAU to GAU✓
- and anticodon CGG into AGG✓.
- Amino acid leucine will be replaced by glutamine✓
- and proline will be replaced by serine✓
- Resulting in a different protein being formed✓. Any (5)
(12)

2.2 2.2.1 (a) Spindle fibre✓ (1)

(b) Prophase I✓ (1)

2.2.2 (a) Forms spindle fibres✓ (1)

(b) Joins two chromatids/daughter chromosomes together✓ (1)

2.2.3

Anaphase (Meiosis) I	**Anaphase (Meiosis) II**
No centromere splits✓	Centromere splits✓
Chromosomes move to opposite poles✓	Chromatids/daughter chromosomes move apart✓
A homologous pair of chromosomes move to one pole as abnormal process **D**✓	A whole chromosome would move to one pole as abnormal process **D** ✓

✓T (5)

(Mark the FIRST TWO only) **1 mark for table + any (2 × 2)**

2.2.4
- One gamete will have extra chromosome 21✓/24 chromosomes
- and when it fertilises a normal gamate✓/gamete with 23 chromosomes
- The zygote will have 3 copies of chromosome 21✓/47 chromosomes
- Resulting in Down syndrome✓ Any (4)

(13)

2.3 2.3.1 13✓ (1)

2.3.2 Follicle (diameter) was the largest✓/ Follicle (diameter) decreases after day 13 (1)
(mark the FIRST one only)

2.3.3 LH✓ (1)

2.3.4 Oestrogen✓ (1)

2.3.5 It thickens the endometrium✓ (1)

2.3.6 No✓ (1)

2.3.7
- Corpus luteum disintegrated✓/follicle size decreases towards day 28
- Causing progesterone levels to drop✓
- And endometrium will break down✓ (3)

(9)

2.4
- Zygote is formed✓
- Which undergoes mitosis✓ multiple times
- Forming a mass ball of cells✓
- Called a morula✓
- Which further undergoes mitosis to form a hollow ball of cells✓
- Called a blastocyst✓ Any **(4)**

2.5 Spermatogenesis✓*
- Under the influence of testosterone✓
- diploid cells in the seminiferous tubules✓/ testis
- undergo meiosis✓
- to form haploid sperm cells✓ **(1 compulsory mark + any 3)** **(4)**

2.6 2.6.1
- Gland that secretes hormones into the blood stream✓✓

OR

- Ductless gland that secretes hormones✓✓ (2)

2.6.2
- Water level in the blood increases✓
- Hypothalamus is stimulated✓ /detects this increase
- A message is sent to the pituitary gland✓
- And less ADH is secreted✓ into the blood
- Permeability of the nephron/distal convoluted tubule decreases✓
- Less water is reabsorbed into the blood✓
- More water is excreted as urine✓/dilute urine is produced
- Water level in the blood drops back to normal✓ Any (6)

(8)
[50]

QUESTION 3

3.1 3.1.1 Sclera✓ (1)

3.1.2 Cataracts✓ (1)

3.1.3 Surgery✓ (1)
(mark the FIRST one only)

3.1.4 Diagram **3**✓ (1)

3.1.5
- The pupil is constricted✓*/narrower
- due to radial muscles relaxing✓
- and circular muscles contracting✓
- to cause less light to enter✓ **1 compulsory mark** + any 2 (3)

3.1.6 (a) Part B/ Ciliary muscles contract✓✓ (2)

(b) Part C/ The lens becomes more convex✓✓ (2)
(11)

3.2
- A change in direction and speed✓ of the body
- causes the movement of fluid in the semi-circular canals✓
- which stimulates the cristae✓
- A change in the position of the head✓
- stimulates the maculae✓ in the utriculus and sacculus
- The stimulus is converted into an impulse✓
- which were transported along the auditory nerve✓
- and interpreted in the cerebellum✓
- which sends impulses into the skeletal muscles✓
- to restore balance✓ Any **(6)**

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3.3 3.3.1 Aldosterone✓ (1)
(Mark the FIRST one only)

3.3.2
- Enlarged penis✓
- Poor weight gain/weight loss✓
- Dehydration✓ (3)

(Mark the FIRST THREE only)

3.3.3 (a)
- High androgens✓
- promote rapid growth✓ Any (2)

(b)
- Low amount of adrenalin✓* leads to
- Less/No conversion of glycogen into glucose✓
- Less/No increase in breathing rate and heart rate✓
- Less oxygen goes to skeletal muscles✓
- And less blood flows to the brain and skeletal muscles✓
- Low levels of cellular respiration✓
- Resulting in the lack of energy✓causing weakness and tiredness. **(1 compulsory + Any 5)** (6)

(12)

3.4 3.4.1 (a) Unaffected✓ male (1)

(b) Gg✓ and GG✓ (2)

3.4.2
- Skomota is unaffected✓/does not have galactosemia
- and has Zandile/Sonwabile who are affected✓ with galactosemia /gg
- therefore must have inherited a recessive allele (g) from each parent ✓ (3)

3.4.3 P_1 Phenotype - Affected (male) × unaffected✓ (woman)
Genotype gg × Gg✓
Meiosis
G/Gametes g, g × G, g ✓
Fertilisation
F_1
Genotype Gg Gg gg gg✓
Phenotype Unaffected affected✓

P_1 and F_1 ✓
Meiosis and fertilisation✓

Therefore, there is a 50%✓* chance of a child with galactosemia.
(1 compulsory + Any 5)

OR

P_1 Affected male × unaffected woman✓
Phenotype gg × Gg✓
Genotype
Meiosis
Fertilisation
F_1
Phenotype

		Unaffected	
	Gametes	G	g
Affected	g	Gg Unaffected	gg Affected
	g	Gg Unaffected	gg Affected

✓(correct gametes)
✓ (correct genotype)

2 Affected and 2 unaffected✓

P_1 and F_1 ✓
Meiosis and fertilisation✓

Therefore, there is a 50%✓* chance of a child with galactosemia.

Any 5+**1*** (6)
(12)

3.5 3.5.1 Growth of GM salmon✓ (1)

3.5.2
- Serves as a control✓
- to verify that the growth of GM salmon is due to the environment in which it grows✓ (2)

3.5.3
- Same age of salmon/five day old salmon in each group✓
- Same species of salmon✓
- The measurement was done every month for 12 months✓ (1)

(mark FIRST one only)

3.5.4 [(120 – 95) ÷ 95] ✓ **OR** (25/95) ✓ × 100✓
= 0,26 × 100✓ = 26%✓
= 26%✓ (3)

3.5.5 GM salmon grows the best/the largest in the hatchery than in the simulated natural environment✓✓. (2)
(9)
[50]

TOTAL SECTION B: [100]

GRAND TOTAL: [150]

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