

KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL
SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES

COMMON TEST

MEMORANDUM - JUNE 2022



MARKS: 150

This memorandum 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	D✓✓		
	1.1.2	C✓✓		
	1.1.3	C✓✓		
	1.1.4	A✓✓		
	1.1.5	A✓✓/C		
	1.1.6	B✓✓		
	1.1.7	C✓✓		
	1.1.8	C✓✓		
	1.1.9	D✓✓		
	1.1.10	B✓✓	(10 x 2)	**(20)**

1.2	1.2.1	Ovipary✓/Oviparous	
	1.2.2	Haploid✓	
	1.2.3	Nucleotide✓	
	1.2.4	Double helix✓	
	1.2.5	Prolactin✓	
	1.2.6	Homeostasis✓	
	1.2.7	Vasodilation✓	
	1.2.8	Replication✓	
	1.2.9	Allantois✓	**(9)**
1.3	1.3.1	A only✓✓	(2)
	1.3.2	None✓✓	(2)
	1.3.3	Both A and B✓✓	(2)
			(6)
1.4	1.4.1	(a) Chromatid✓	(1)
		(b) Centromere✓	(1)
	1.4.2	Crossing-over✓	(1)
	1.4.3	Prophase I✓	(1)
	1.4.4	Chiasma✓	(1)
	1.4.5	It is where genetic material is exchanged✓/point of overlap/contact/attachment of chromatids	(1)
	1.4.6	Homologous pair✓	(1)
			(7)

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1.5 1.5.1 (a) PpRr✓ (1)

(b) pprr✓ (1)

1.5.2 PR, Pr, pR, pr✓✓ **(2 Marks or nothing/No part marks)** (2)

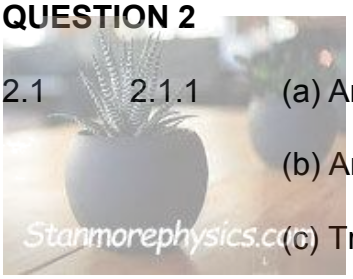
1.5.3 (a) Black eyes with rough fur✓ (1)

(b) Purple eyes with rough fur✓ (1)

1.5.4 PPRR✓✓ (2)
(8)

SECTION B

QUESTION 2



2.1 2.1.1 (a) Anti-codon✓ (1)

(b) Amino acid✓ (1)

(c) Translation✓ (1)

2.1.2 - Carries a coded message✓/Formation of mRNA for the formation of a specific protein (1)

2.1.3 Adenine✓/A and Guanine✓/G (2)

2.1.4
- 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 the DNA✓.
- mRNA now has the coded message for protein synthesis✓.

Any 5 (5)

2.1.5 Glycine✓ Methionine✓ Arginine✓ **(In this order)** (3)
(14)

2.2 2.2.1
- Decide on the sample size✓
- Decide on the sample selection✓
- Get permission from the school✓ to conduct the investigation
- Decide on the appropriate time/day/venue to conduct the investigation✓
- Decide on how to record results of the investigation✓
- Ask for permission from the participants✓

(Mark the FIRST THREE only) any 3 (3)

2.2.2 - Same person counted✓
- Equal number of boys and girls✓ (2)

2.2.3 To ensure/increase the reliability✓ of the investigation (1)

2.2.4

	Boys	Girls
Tongue rollers	260	220
Non-tongue rollers	15	55

(4)
(10)

Marking Criteria:

Columns heading(**C**)	1
Rows heading (**R**)	1
Data correct in the table (**T**)	1: 1-3 correct 2: All correct

2.3 2.3.1 Pituitary✓ gland/Hypophysis (1)

2.3.2 ADH✓/Anti-diuretic hormone (1)

2.3.3 Hormone 1✓/ADH decreases (1)

2.3.4 2✓ (1)



2.3.5
- Increase in ADH✓
- Increases permeability of the distal convoluted tube✓/nephron
- More water leaves the nephron✓
- Into the medulla✓/surrounding tissue fluid
- And eventually enters the blood✓
- Which increases water level in the blood✓ back to normal. (5)
(9)

2.4
- During anaphase✓ I/II
- Chromosomes/chromatid on pair 21✓
- may fail to separate✓/non-disjunction occurs
- resulting in a gamete with an extra chromosome✓ on pair 21
- when this gamete fertilises with a normal gamete✓/ with 23 chromosomes
- it will result in a zygote with 47 chromosomes✓/3 chromosomes in 21
- leading to Down syndrome Any 5 **(5)**

2.5 2.5.1 (a) Cell body✓ (1)

(b) Sensory✓/afferent neuron (1)

(c) Effector✓/muscle (1)



2.5.2 (a) Transmit impulses from/connects the sensory neuron to the motor neuron✓. (1)

(b) Ensures one directional flow of impulses✓. (1)

2.5.3 (F, B, D) ✓✓ **In this order!** (2)
(7)

2.6
- Pituitary gland is stimulated✓
- to secrete less TSH✓
- which stimulates the thyroid gland✓
- to secrete less thyroxin✓ into the blood
- therefore thyroxin level decreases✓
- back to normal✓

Any 5 **(5)**

[50]

QUESTION 3

3.1 3.1.1 (a) Vagina✓ (1)

(b) Cervix✓ (1)

3.1.2 Placenta✓ (1)

3.1.3
- The other fallopian tube✓
- will allow the sperm to meet the ovum✓
- therefore fertilisation will still occur✓/pregnancy can occur

OR

- sperm cell will not reach the ovum✓
- fertilisation will not occur✓
- resulting in infertility✓. (3)

3.1.4
- Diploid cells in the ovary undergo mitosis✓
- to form numerous follicles✓.
- At the onset of puberty✓
- and under the influence of FSH✓,
- one cell inside a follicle enlarges and undergoes meiosis✓.
- Of the four cells that are produced, only one survives✓
- to form a mature, haploid ovum✓.

Any 4 (4)

(10)

3.2 3.2.1
- bleeding for longer than a week✓
- heavy menstrual flow✓

(Mark the FIRST TWO only) (2)

3.2.2
- If ovulation does not occur✓/ovum is not released
- corpus luteum will not be formed✓ (2)

3.2.3
- More blood will be lost✓
- within a short space of time✓
- leading to poor oxygen supply✓
- decreasing the rate of respiration✓
- less energy will be available✓. (3)

(7)

3.3 3.3.1 (a) No answer

(b) Pituitary gland✓ (1)

(c) Cerebellum✓ (1)

3.3.2
- Breathing and heartbeat will stop✓
- Causing lack of oxygen to the cells✓ (2)

3.3.3
- Controls voluntary actions✓
- Interprets sensations✓
- Responsible for higher thought processes✓ e.g. memory, judgement.

(Mark the FIRST TWO only) Any 2 (2)

3.3.4 No answer **(6)**

3.4
- Change in position of a head✓
- causes the endolymph to move✓
- which stimulates maculae✓ in the sacculus and utriculus
- Maculae converts the stimulus into an impulse✓
- which travels via the auditory nerve✓
- to the cerebellum✓
- Cerebellum sends impulses to the skeletal muscles✓
- to restore balance✓

Any 4 **(4)**

3.5 3.5.1 Rods✓ (1)

3.5.2
- Circular muscles contract✓
- Radial muscles relax✓
- Pupil constrict✓
- Less light enters the eye✓
- Objects are seen clearly✓

Any 4 (4)

(5)

3.6 3.6.1 (a) 3✓ (1)

(b) 3✓ (1)

3.6.2 Complete dominance✓ (1)

3.6.3
- When two different alleles are inherited✓
- The dominant allele controls the phenotype✓
- Masking over the effect of the recessive allele✓

Any 2 (2)

3.6.4 Pp✓and pp✓ (2)

3.6.5 4✓ (1)

3.6.6

P1 Phenotype: Bull with horns × cow without horns ✓
Genotype: pp × Pp ✓
Meiosis
G/Gametes: p, p × P, p ✓
Fertilisation
F1
Genotype: Pp pp Pp pp ✓
Phenotype: No horns Horns No horns Horns ✓

P1 and F1 ✓
Meiosis and fertilisation ✓

2/4×100% = 50% ✓*
Any 6 + **1***

OR

P1 Phenotype: Bull with horns × Cow without horns ✓
Genotype: pp × Pp ✓
Meiosis
Fertilisation
F1
Phenotype:

Cow without horns	Bull with horns: p	Bull with horns: p
Gametes	p	p
P	Pp No horns	Pp No horns
p	pp Horns	pp Horns

✓(correct gametes)
✓ (correct genotype)
2 horned calves 2 calves without horns ✓

P1 and F1 ✓
Meiosis and fertilisation ✓

2/4×100% = 50% ✓*
Any 6+**1*** (7)
(15)
[47]

TOTAL SECTION B: 97
GRAND TOTAL: 147

Use the table below to adjust marks to 150.

Mark obtained	
1 – 24	Add 0
25 – 73	Add 1
74 – 93	Add 2
94 – 147	Add 3

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