KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES

COMMON TEST

MARKING GUIDELINES

JUNE 2023

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MARKS: 148

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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	C✓✓		
	1.1.2	No answer		
	1.1.3	A✓✓		
	1.1.4	B✓✓		
	1.1.5	A✓✓		
	1.1.6	B✓✓		
	1.1.7	A✓✓		
	1.1.8	C✓✓		
	1.1.9	C✓✓		
	1.1.10	B✓✓	(10 x 2)	**(20)**
1.2	1.2.1	Yellow spot✓		
	1.2.2	Allantois✓		
	1.2.3	Receptor✓		
	1.2.4	Multiple sclerosis✓		
	1.2.5	Aldosterone✓		
	1.2.6	Adrenal✓ gland		
	1.2.7	Precocial✓		
	1.2.8	Cloning✓		
	1.2.9	Locus✓		
1.3	1.3.1	None✓✓		(2)
	1.3.2	A only✓✓		(2)
	1.3.3	B only✓✓		(2)
				(6)
1.4	1.4.1	(a) Male✓		(1)
		(b) Gonosome✓		(1)
		(c) Down Syndrome✓		(1)
		(d) Non-disjunction✓		(1)
		(e) Anaphase I✓/II		(1)
	1.4.2	- Produces gametes✓ - Introduces genetic variation✓ - Keeps chromosome number constant from generation to generation✓ **(Mark the FIRST TWO only)**		(2) **(7)**

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1.5 1.5.1 (a) 3✓ (1)

(b) 2✓ (1)

(c) 2✓ (1)

(d) 4 (1)

1.5.2 bb✓ (1)

1.5.3 Black hair✓ (1)

1.5.4 25%✓✓ (2)
(8)

SECTION B

QUESTION 2

2.1 2.1.1 (a) tRNA✓ (1)

(b) A U U✓✓ (2)

2.1.2 (a) P✓ (1)

(b) T✓ (1)

2.1.3 Transcription✓ (1)

2.1.4 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✓. **1 Compulsory** + Any 4 (5)

2.1.5 T G T✓ (1)

2.1.6
- A change in the DNA base sequence✓
- Changes the codons of the mRNA✓
- Which then complements a different tRNA✓
- Bringing a different amino acid to the ribosome✓
- Resulting in a different protein✓

OR

- A change in the DNA base sequence✓
- Changes the codons of the mRNA✓
- Which then complements a different tRNA✓
- Bringing the same amino acid to the ribosome✓
- Resulting in the same protein✓ Any (3)
(15)

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2.2 2.2.1 (a) Epididymis✓ (1)

(b) Penis✓ (1)

(c) Scrotum✓ (1)

2.2.2 (a) - Semen will not contain sperm cells✓
- therefore an ovum will not be fertilised✓ (2)

(b) Produces an alkaline fluid✓ to neutralise the acidity of the vagina✓ (2)

(c) - Exposed to a temperature that is cooler than body temperature✓
- for healthy sperm production✓. (2)
(9)

2.3 2.3.1 - Corpus luteum✓
- Placenta✓ (2)
(Mark first TWO only)

2.3.2 Progesterone levels are increasing✓ (1)

2.3.3 - High levels of progesterone✓
- inhibits/causes a decrease in the secretion of FSH✓ (2)

2.3.4 To prevent the growth of a new follicle✓/ovulation during the pregnancy (1)

2.3.5 39,5 – 21,6 = 17,9✓
(17,9 ÷ 21,6) ×100✓
= 82,87✓ / 82,9 / 83% (3)

2.3.6 (a) - The endometrium/uterine lining/placenta will not be maintained✓
- (Vaginal) bleeding will begin✓
- the placenta will detach✓ /miscarriage will occur. (2)

(b) Give the woman progesterone supplements✓ (1)
(12)

2.4
- 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 **(5)**

2.5	2.5.1	(a) Chromatid✓		(1)
		(b) Cytoplasm✓		(1)
	2.5.2	Anaphase I✓		(1)
	2.5.3	Chromosomes✓ are moving to the opposite poles✓		(2)
	2.5.4	Cell 1✓		(1)
	2.5.5	- Joins and holds two chromatids together✓ - Attaches the chromosome to the spindle fibre✓ **(Mark the FIRST one only)**		(1)
	2.5.6	A✓ - Centrosome✓		(2) **(9)** **[50]**

QUESTION 3

3.1	3.1.1	(a) Auditory nerve✓		(1)
		(b) Ossicles ✓		(1)
	3.1.2	Equalises pressure on either side of the tympanic membrane✓		(1)
	3.1.3	E, D, C and F✓✓		(2)
	3.1.4	- Maculae at H are stimulated✓ - by the change in the position of the head✓ - and converts the stimulus into an impulse✓ - which is sent via the auditory nerve✓ - to the cerebellum✓then to the skeletal muscle✓ - to restore balance✓	Any	(4)
	3.1.5	- the stimulus/pressure waves will not be detected✓ - and will not be converted into an impulse✓ - No impulse will be sent to the cerebrum✓ - Hearing will not occur✓	Any	(3) **(12)**
3.2	3.2.1	- Every characteristic is controlled by two factors✓/alleles which separate during gamete formation✓/meiosis - so that each gamete/sperm/ovum carries one of these factors✓/alleles.	Any 3	(3)
	3.2.2	Dihybrid✓ cross		(1)
	3.2.3	Incomplete✓ dominance		(1)
	3.2.4	(a) Short✓		(1)

(b) Reddish-brown✓ flowers and tall✓ (2)

(c) PPTT/PPTt✓✓ (2)
(10)

3.3 3.3.1 Female 3✓ (1)

3.3.2 - Two/some bands of the girl's✓DNA profile
- match with those of the father's✓ profile
- The three/remaining bands of the girl's DNA profile match with the bands of female 3's DNA profile✓ (3)

3.3.3 - There could be human error✓
- Different laboratories have different procedures producing different results✓
- Small sample is used therefore may not be a complete representation ✓
- Samples can be deliberately tampered with✓. Any (2)

3.3.4

P_1 Phenotype: Blood group B × Blood group AB✓
Genotype: I^Bi × I^AI^B✓
Meiosis
G/Gametes: I^B, i × I^A, I^B ✓
Fertilisation
F_1
Genotype: I^AI^B I^BI^B I^Ai I^Bi ✓
Phenotype: Blood groups: AB ; B ; A ;B✓

P_1 and F_1 ✓
Meiosis and fertilisation✓
Therefore, she cannot have a child who is blood group O ✓*
Any 5 + **1***

OR

P_1
Phenotype: Blood group B × Blood group AB✓
Genotype: I^Bi × I^AI^B✓
Meiosis
Fertilisation
F_1

Gametes	I^B	i
I^A	I^AI^B AB	I^Ai A
I^B	I^BI^B B	I^Bi B

✓(correct gametes)
✓ (correct genotype)

Phenotype: A, AB and 2B✓
P_1 and F_1 ✓
Meiosis and fertilisation✓
Therefore, she cannot have a child who is blood group O ✓* Any 5+**1*** (6)
(8)

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3.3.5
- The girl has blood group O✓/genotype ii.
- the girl would have inherited two recessive alleles from each parent✓
- Either female 2 or female 3 could be the mother✓ of the girl
- since both females may have the i allele✓
- The father is blood group B and may have the genotype I^Bi✓/heterozygous for blood group (5)

(17)

3.4 3.4.1 (a) Energy levels✓ (1)

(b) By determining the average duration of the running time✓ (1)

3.4.2 Nicotine consumption increases the stamina of the athletes✓✓ (2)

3.4.3
- If too little time passes between the exercise tests, the participants may be tired✓
- which will decrease the validity✓ of the investigation

OR

- The participants must be equally rested✓ for both tests
- to ensure the validity✓ of the investigation

OR

- The cyclist may perform better in the second test because they are better warmed up✓ if the time between the tests is too short.
- This may influence the validity of the investigation✓ (Any 1 x 2) (2)

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3.4.4
- To show that any change in the stamina is due to the consumption of nicotine only✓✓ (2)

3.4.5
- blood vessels will dilate✓/vasodilation will occur
- resulting in increased blood flow✓. (2)

3.4.6
- Athletes must be of the same age✓
- Same fitness level✓
- On the same diet✓
- Same gender✓
- Drink the same amount of tea✓
- Tea must have the same amount of nicotine
- The athletes must be rested for the same amount of time ✓ Any (1)

(Mark the FIRST ONE only) **(11)**

[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150