

MARKING GUIDELINES

EXAMINATION		NATIONAL SENIOR CERTIFICATE	
GRADE		12	
DATE		NOVEMBER 2024	
SUBJECT		LIFE SCIENCES	
PAPER		2	
TOTAL		150	
DURATION (HOURS)		2½	
NUMBER OF PAGES		14	



SOUTH AFRICAN COMPREHENSIVE ASSESSMENT INSTITUTE
SUID-AFRIKAANSE KOMPREENSIEWE ASSESSERINGSINSTITUUT



PRINCIPLES RELATED TO MARKING LIFE SCIENCES 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.
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 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 marking guideline 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. Marking guideline will allocate marks for units separately.
16. **Be sensitive to the sense of an answer, which may be stated in a different way but still be correct.**



17. **Caption**

All illustrations (diagrams, drawings, 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.

19. **No changes must be made to the marking guideline without consulting the SACAI CHIEF MARKER and SACAI MODERATOR and where applicable, also the UMALUSI MODERATOR.**

SECTION A**QUESTION 1**

1.1

1.1.1 C✓✓

1.1.2 B✓✓

1.1.3 C✓✓

1.1.4 B✓✓

1.1.5 D✓✓

1.1.6 A✓✓

1.1.7 C✓✓

1.1.8 A✓✓

1.1.9 B✓✓

1.1.10 D✓✓

(10x2) (20)

1.2

1.2.1 Biogeography✓

1.2.2 Opposable✓ (fingers)

1.2.3 Peptide✓ (bond)

1.2.4 Out of Africa✓ hypothesis

1.2.5 Biodiversity✓

1.2.6 *Homo habilis*✓

1.2.7 (Gregor) Mendel✓

(7x1) (7)

1.3

1.3.1 (Both) A and B✓✓

1.3.2 A (only)✓✓

1.3.3 B (only)✓✓

1.3.4 A (only)✓✓

1.3.5 None✓✓

(5x2) (10)

1.4

1.4.1 Translation✓ (1)

1.4.2 a) ribosome✓ (1)

b) transfer RNA✓/tRNA (1)

1.4.3 Anticodon✓ (1)

1.4.4 UCA✓ (1)

1.4.5 Messenger Ribonucleic acid✓ (1)

- 1.4.6
- It carries the genetic code from the DNA✓
 - to the cytoplasm✓/ribosome
 - where it will give the instruction for the sequence of amino acids✓ of the protein
- (3)

1.4.7

DNA	RNA
Consists of a double strand✓	Consists of a single strand✓
Very long strand✓	Shorter strand✓

(No mark allocated for table)
(Mark first TWO differences only) (4)

[13]

TOTAL SECTION A: [50]

SECTION B

QUESTION 2

2.1

- 2.1.1 • Group of similar organisms✓ that can breed
• to produce fertile offspring✓ (2)
- 2.1.2 • The trees from Africa and Australia have different species names✓.
• This indicates that the trees have different genomes✓ / not able to interbreed and produce fertile offspring. (2)
- 2.1.3 Geographical✓ / Allopatric speciation (1)
- 2.1.4 • The original baobab tree population in Madagascar and the population in Australia was separated by the ocean✓*/ population was split in two by the ocean (*** compulsory mark**)
• No gene flow✓ / reproduction between the two populations
• Madagascar and Australia had different environmental conditions✓/ different selective forces
• Each population underwent natural selection independently✓
• or different mutations occurred in the two populations✓
• This caused their genotype and phenotype to become different✓
• Two new species were formed that will not be able to interbreed✓
(1 compulsory mark + any 5 other) (6)
- 2.1.5 Seasonal✓ / Temporal isolation / breeding at different times of the year (1)

[12]

2.2

- 2.2.1 Anaphase I✓ (1)
- 2.2.2 a) Centromere✓ (1)
b) Centriole✓ (1)
c) Spindle fibre✓ (1)

- 2.2.3 a) Non-disjunction✓ (1)
- b) • Pair of homologous chromosomes✓
 • failed to separate✓
 • and are pulled to one pole of the cell✓ / pulled to the same pole (3)
- 2.2.4 Four ✓/4 (1)
- 2.2.5 • Two daughter cells will have three/3 chromosomes each✓
 • Two daughter cells will have one/1 chromosome each✓ (2)
- 2.2.6 • Down syndrome✓ / Trisomy 21
 • Klinefelter syndrome✓
 • Turner syndrome✓
 • Edward syndrome✓ / Trisomy 18
 • Patau syndrome✓
(Any one) (Mark FIRST answer only) (1)
- 2.2.7 • During crossing over✓
 • a random exchange✓
 • of segments of chromatids✓ between chromosomes A and B occurred
 • to produce recombinant chromatids✓
(Any THREE correct answers) (3)
- 2.2.8 • Meiosis gives rise to new combinations of genetic material✓ / causes variation in offspring
 • which is acted upon by natural selection✓ / offspring with the most favourable feature will survive / offspring without favourable feature will not survive in a changing environment (2)

[17]

2.3

2.3.1 Cradle of Humankind✓ (1)

2.3.2 Palaeontologist✓ (1)

2.3.3 *Australopithecus sediba*✓
(Genus name must be with capital letter and species name with small letter) (1)

2.3.4 Cladogram✓/ phylogenetic tree (1)

2.3.5 • Diagram 2: *Homo naledi* appeared after *Homo erectus*✓ / *Homo naledi* is closer related to *Homo sapiens* than *Homo erectus*.
 • Diagram 3: *Homo naledi* appeared before *Homo erectus*✓ / *Homo erectus* is more closely related to *Homo sapiens* than *Homo naledi*. (2)

2.3.6 • (High) foot arch✓ to absorb shock✓ while walking.
 • Big toe is in line with other toes✓ for balance✓.
 • Presence of heel bone✓ to support more weight✓ when in upright position.
(Any 2x2) (Mark first TWO answers only) (4)

2.3.7 Lucy✓ (1)

2.3.8 Yes (no mark)
 • The exhibition attracts tourists✓
 • Contribute to economic benefit to area✓.

OR

• The exhibition plays an important educational role✓
 • Improve public/school learners understanding of evolution✓.

OR

No (no mark)
 • Some people may have religious✓/cultural concerns
 • Human remains are seen as sacred✓ / link with ancestors / contains spirit of deceased.
(Any 1x2) (Mark FIRST answer only) (2)

2.3.9 Disagree with classification as *Homo* species (no mark)

- Cranium is too small✓ / sloping forehead.
- Prominent eyebrow ridges✓
- Sloping face✓ / lower jaw is prognathous.

OR

Agree with classification as *Homo* species (no mark)

- Canines are the same length as the other teeth✓/all teeth are the same length.
- Lower jaw is smaller than those of *Australopithecines*✓.
- Lower jaw is more rounded✓.
- No diastema✓ / space between canines and adjacent teeth.

(Any 2) (Mark first TWO answers only) (2)

[15]

2.4

- 2.4.1 • Production of offspring from the mating✓
 • of genetically closely related organisms✓. (2)

- 2.4.2 • Fencing around game reserves✓ / lions are in an enclosed area.
 • prevents reproduction between different lion populations✓/outbreeding. (2)

- 2.4.3 • Inbreeding decreases the gene pool✓ / genetic variation of a population.
 • This increases the recessive detrimental alleles present in the members of the population✓ / increased homozygosity for harmful alleles. (2)

[6]

TOTAL QUESTION 2: [50]

QUESTION 3

3.1

3.1.1 Heading: Results of surveys done in 2001 and 2005 on the public's opinion on the reliability of DNA profiles as evidence.

Level of reliability	Amount of people (%)	
	2001	2005
Completely	15	18
Very	49	54
Somewhat	33	24
Not at all	3	4

Mark allocation:

Heading (H)	All variables mentioned	1 mark
Column headings (C)	Level of reliability	1 mark
	Amount of people (%); 2001 and 2005	1 mark
Table (T)	All border lines of table drawn	1 mark
Data in rows (D)	4 rows correct	2 marks
	1–3 rows correct	1 mark

(6)

- 3.1.2 • Both DNA profiles and fingerprints involve the matching of patterns✓
 • Both DNA profiles and fingerprints are unique to a person✓ (2)

- 3.1.3 • Revealing of family relations ✓/paternity
 • Identifying disaster victims ✓/missing persons
 • Study of the biodiversity of species ✓
 • Identifying genetic diseases✓/ abnormalities
 • Identifying genetically modified crops ✓
 • Fight against illegal trade in plant or animal products ✓
 • Identifying pathogens ✓
 • Determining compatibility of tissue types for organ transplants✓

(Any 2) (Mark first TWO answers only)

(2)

- 3.1.4
- The issue of accuracy✓
 - for example, human error in lab✓ / faulty equipment.

OR

- The issue of manipulation✓
- someone can be framed✓ / evidence placed on crime scene / bribery of person in crime lab

OR

- Only small part of DNA is tested✓
- and this may be the same for close family members✓

(Any 1x2) (Mark FIRST answer only)

(2)

[12]

3.2

- 3.2.1
- The salmon's genome/genetic material has been changed✓
 - by the transfer/introduction of genes from other fish species✓
 - by artificial means✓.

(3)

- 3.2.2
- Breeders will select salmon that have shown fast growth✓
 - and breed them with each other✓
 - The fastest growing offspring will be interbred✓
 - This process will be repeated for many generations✓

(Any THREE correct answers)

(3)

- 3.2.3
- The GM salmon grows to market-size faster than wild salmon✓
 - Less wild salmon will be caught ✓ and therefore more salmon available for future use✓/ conserves wild salmon stock

(Any TWO correct answers)

(2)

- 3.2.4
- Concerns that not enough research was done on the health effect on humans✓/ may cause allergic reactions when consumed by humans
 - GM salmon may escape and could outperform wild salmon in their competition for crucial resources✓/wild salmon outcompete to extinction
 - Religious concerns that humans are interfering with nature✓
 - It is an expensive process✓

(Any 2) (Mark first TWO answers only)

(2)

3.2.5 Yes (no mark)

- Consumers have a right to know what's in their food✓
- And if a consumer is concerned about GM ingredients in their food products, labelling will help with their buying decisions✓

OR

No (no mark)

- GM salmon was approved by the FDA to be safe for human consumption✓
- There are many other food types that are unhealthy and are not labelled to warn the public✓

OR

- If GM salmon products are labelled it can prevent consumers to buy it✓
- and this can have a negative effect on the development of new GM products✓

(Any correct 1x2) (Mark FIRST answer only)

(2)

[12]

3.3

3.3.1 Number of learners with blood group AB = $\frac{4}{100} \checkmark \times 650 \checkmark$
 = 26✓ leaners (3)

- 3.3.2
- A person with type AB blood group is heterozygous✓ / allele for both blood group A and B present/ they inherit the allele for A blood group from one parent and the allele for B blood group from another parent / both A and B alleles
 - which means that both the A allele and the B allele are equally expressed✓ / both expressions of type A and B blood group are present (2)

3.3.3 Pie✓ graph/ chart

(1)

3.3.4

P₁/parent: Phenotype: blood group A x blood group B ✓
Genotype: I^A i x I^B i ✓

✓ {

 ✓ {

Meiosis

Gametes: I^A ; i ; I^B ; i ✓

Fertilisation

F₁/offspring: Genotype : I^AI^B ; I^B i ; I^A i ; ii ✓

Phenotype:

 25% blood group AB

 25% blood group B

 25% blood group A

 25% blood group O } *✓ (compulsory mark)

OR

P₁/parent: Phenotype: blood group A x blood group B ✓
Genotype: I^A i x I^B i ✓

✓ {

 ✓ {

Meiosis

Gametes: I^A ; i ; I^B ; i ✓

Fertilisation

F₁: Genotype:

Gametes	I ^A	i
I ^B	I ^A I ^B	I ^B i
i	I ^A i	ii

} ✓ Genotype

F₁/offspring: Phenotype: 25% bloodgroup AB

 25% bloodgroup B

 25% bloodgroup A

 25% bloodgroup O } *✓ (compulsory mark)

(1* compulsory mark + any 5 others) (6)

- 3.3.5 a) Continuous✓ variation (1)
 b) Wide range of values for the same phenotype✓/ same trait is shown / same phenotype / intermediate values between two extremes. (1)
- 3.3.6 a) Locus✓ (1)
 b) Autosome✓ (1)
- 3.3.7 • Measure the height of the learners accurately✓
 • Use the same instruments to measure the height✓
 • All the instruments to measure the height must be calibrated✓ / accurately marked
(Any 2) (Mark first TWO answers) (2)

[18]

3.4

- 3.4.1 • Structures with the same basic structural plan✓
 • but different functions✓ (2)
- 3.4.2 A✓; C✓; D✓_{sa}
(Mark first THREE answers only) (3)
- 3.4.3 • Organisms with homologous structures share a recent common ancestor✓
 • The structures became adapted to different environments✓
 • therefore, show different functions✓. (3)

[8]

TOTAL QUESTION 3: [50]

TOTAL SECTION B: [100]

GRAND TOTAL: [150]