

SA's Leading Past Year

Exam Paper Portal

STUDY

You have Downloaded, yet Another Great Resource to assist you with your Studies 😊

Thank You for Supporting SA Exam Papers

Your Leading Past Year Exam Paper Resource Portal

Visit us @ www.saexampapers.co.za



SA EXAM
PAPERS



**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

SEPTEMBER 2022

**LIFE SCIENCES P2
MARKING GUIDELINE**

MARKS: 150

This marking guideline consists of 10 pages.

PRINCIPLES RELATED TO THE MARKING OF 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 parts.
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. 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.**
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 appear(s) 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.

SECTION A

QUESTION 1

- 1.1 1.1.1 A ✓✓
 1.1.2 C ✓✓
 1.1.3 B ✓✓
 1.1.4 C ✓✓
 1.1.5 C ✓✓
 1.1.6 A ✓✓
 1.1.7 A ✓✓
 1.1.8 D ✓✓
 1.1.9 A ✓✓
 1.1.10 D ✓✓ (10 x 2) (20)
- 1.2 1.2.1 Chiasma ✓/ chiasmata
 1.2.2 Gene ✓
 1.2.3 Interphase ✓
 1.2.4 Mitochondrial DNA ✓
 1.2.5 DNA profile ✓
 1.2.6 Punctuated equilibrium ✓
 1.2.7 Population ✓
 1.2.8 (Biological) evolution ✓ (8 x 1) (8)
- 1.3 1.3.1 A only ✓✓
 1.3.2 B only ✓✓
 1.3.3 B only ✓✓ (3 x 2) (6)
- 1.4 1.4.1 4 ✓ (1)
 1.4.2 (a) Male without albinism ✓ (1)
 (b) nn ✓✓ (2)
 (c) Nn ✓✓ (2)
 1.4.3 75 ✓✓% (2)
- 1.5 1.5.1 (Double) Helix ✓ (1)
 1.5.2 (a) Deoxyribose ✓ (1)
 (b) Adenine ✓ (1)
 (c) Hydrogen ✓ bond (1)
 1.5.3 • Double stranded ✓
 • Has thymine ✓ not uracil
 • Nitrogenous bases are in pairs ✓ (Any 2 x 1)
(Mark first TWO only) (2)
 1.5.4 Nucleus ✓
 Mitochondrion ✓
(Mark first TWO only) (2)

TOTAL SECTION A: 50

QUESTION 2

2.1 2.1.1 GGG - CCA- AGU ✓✓ (ALL or NONE) (2)

2.1.2 Glycine ✓ - Proline ✓ - Serine ✓ (3)

2.1.3

- The codon would change to UGG ✓
- The anticodon with ACC ✓
- will bring the tryptophan ✓
- instead of glycine ✓
- sequence of amino acids will change ✓ /a different protein will form (Any 4 x 1) (4)

2.1.4

- Each tRNA carries a specific amino acid ✓
- to the codon on the mRNA ✓/ ribosome (2)

2.1.5

DNA Replication	Transcription
Two DNA strands are used as template ✓	One DNA strand is used as template ✓
Free DNA nucleotides join ✓ to DNA template	Free RNA nucleotides join ✓ to DNA template
Whole DNA unwinds	A part of DNA unwinds
A pairs with T	A pairs with U

Table ✓

Mark first TWO only (Any 2 x 2 + 1) (5)

2.2 2.2.1 The number and appearance/type of chromosomes in the cell of an organism. ✓✓ (2)

2.2.2 8 ✓ (1)

2.2.3

- Females are XX ✓
- and males are XY ✓ (2)

2.3 2.3.1

- When two homozygous organisms with contrasting characteristics are crossed, ✓
- all the individuals of the F1 generation will display the dominant trait ✓

OR

- An individual that is heterozygous for a particular characteristic ✓
- will have the dominant trait as the phenotype ✓ (Any 1 x 2) (2)

2.3.2	P₁	Phenotype	Red-eyed female	x	White-eyed male ✓
		Genotype	$X^R X^r$ ✓	x	$X^r Y$ ✓
	Meiosis	G/gametes	X^R, X^r	x	X^r, Y ✓
	Fertilisation	F₁	Genotype	$X^R X^r ; X^R Y ; X^r X^r ; X^r Y$ ✓*	
			Phenotype	1 Red-eyed female : 1 red-eyed male: 1 white-eyed female : 1 white-eyed male ✓*	

P₁ and F₁ ✓

Meiosis and fertilisation ✓

(Any 5 + *2 Compulsory)

OR

P₁	Phenotype	Red eyed female	x	White eyed male ✓
	Genotype	$X^R X^r$ ✓	x	$X^r Y$ ✓
Meiosis	G/gametes	X^R, X^r	x	X^r, Y ✓

Fertilisation	F₁	Gametes	X^r	Y
		X^R	$X^R X^r$	$X^R Y$
		X^r	$X^r X^r$	$X^r Y$
		Correct genotypes ✓*		

Phenotype 1 Red eyed female: 1 red eyed male:
1 white eyed female: 1 white eyed male ✓*

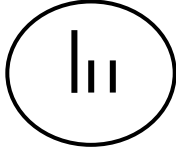
P₁ and F₁ ✓

Meiosis and fertilisation ✓

(Any 5 + *2 Compulsory)

(7)

- 2.4 2.4.1 Continuous ✓ variation (1)
- 2.4.2 There is a range of intermediate phenotypes ✓✓/heights (2)
- 2.4.3
- Plant breeders/people select ✓ characteristic and
 - not nature selecting ✓ characteristic
 - They select those characteristics that are desirable to them ✓/ people
 - and is not beneficial to survival ✓ (2 x 2) (4)
- 2.4.4 Incomplete ✓ dominance (1)
- 2.4.5 Yes ✓
- The orange flowers carry one red allele ✓/ are heterozygous
 - If both plants pass on one red allele ✓ the offspring will be red (3)

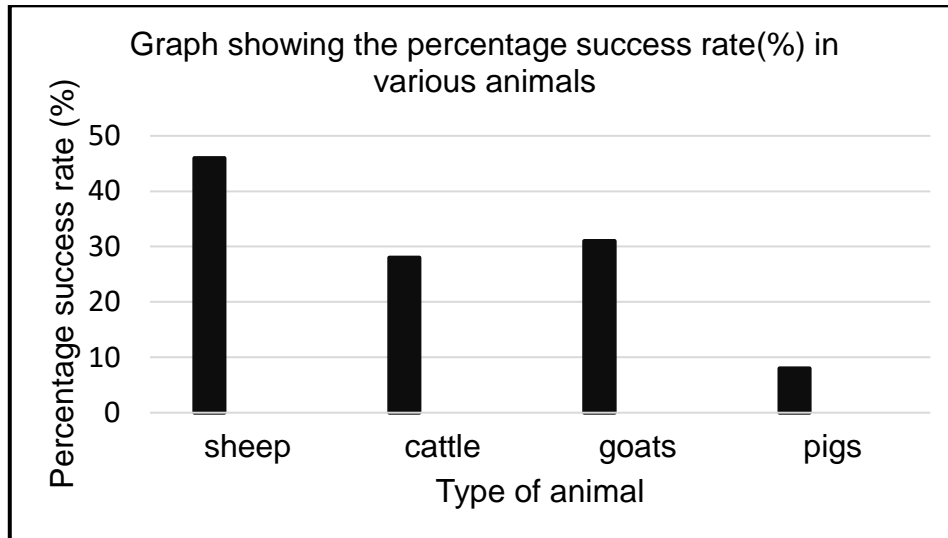
- 2.5 2.5.1 Anaphase 1 ✓ (1)
- 2.5.2 Chromosomal ✓ mutation (1)
- 2.5.3
- A gamete with an extra copy of chromosome 21 ✓ will be formed
 - If this gamete fuses with a normal gamete ✓ / gamete with 23 chromosomes
 - A zygote with 47 chromosomes ✓ / an extra copy of chromosome 21 will be formed
 - This will lead to Down syndrome ✓ (4)
- 2.5.4
- 
- Three single stranded chromosomes drawn ✓
 - Correct size of three chromosomes ✓ (2)
- 2.5.5
- Sperm ✓ cells / spermatozoa (1)
- [50]

QUESTION 3

3.1 3.1.1 Many embryos were transferred into the surrogate mothers ✓/ large sample size of embryos was used. (1)

3.1.2 Success rate of cloning ✓ (1)

3.1.3

**Guideline for assessing graph**

CRITERIA	ELABORATION	MARK
Correct type of graph (T)	Bar graph	1
Caption of Graph (C)	Both variables included	1
Axes labels (L)	<i>x</i> - and <i>y</i> -axis correctly labelled	1
Scale for <i>x</i> - and <i>y</i> -axis	Equal space between bars and width of bars for <i>x</i> -axis and -correct scale for <i>y</i> -axis	1
Plotting of bars	1 to 3 bars plotted correctly	1
	All 4 bars plotted correctly	2

(6)

3.1.4 - Produce organisms with desired traits ✓ e.g. health; appearance; nutritious; yield; shelf-life; etc.
 - Conservation of threatened species ✓
 - To create tissues/organs for transplant ✓
 - Replace damaged tissue ✓
 - Prevent genetic diseases ✓
 - Improve food supply/quality ✓

Mark first ONE only

(Any 1 x 1) (1)

3.1.5 The cost of cloning is very high ✓/ costs R300 000
 The meat would be too expensive ✓
 The success rate is low ✓/ success rate is 28%
 It would take a long time/effort to produce each cow. ✓

(4)

- 3.2 3.2.1 • Elephants normally eat grass, leaves, fruit, bark of trees and the roots of legumes. ✓ (1)
- 3.2.2 $\frac{33}{100}$ ✓ x 91 ✓ = 30 ✓ female elephants (3)
- 3.2.3 • There is a great deal of variation amongst the population of elephants ✓
 • Some have tusks, and some do not ✓
 • When there was an increase in poaching ✓
 • Elephants without tusks, survived ✓
 • whilst elephants with tusks, were killed ✓
 • The elephants that survived, reproduced ✓
 • and pass on the allele for the favourable characteristic to their offspring ✓
 • The next generation therefore had a higher proportion of individuals without tusks. ✓ (Any 5 x 1) (5)
- 3.2.4 • There will be more legumes and trees ✓
 • and less grass ✓
 • as elephants now eat more grass ✓/less legumes/ less bark (Any 2 x 1) (2)
- 3.3 3.3.1 • Is more prognathous ✓
 • Have smaller cranium ✓
 • Have larger jaws ✓
 • Have more U-shape jaw ✓
 • Have prominent brow ridges ✓ (Any 2 x 1) (2)
(Mark first TWO only)
- 3.3.2 • They ate more raw food ✓
 • and therefore, have large teeth ✓ to tear and rip (2 x 1) (2)
- 3.3.3 The hole at the base of the skull where the spinal cord leaves/enters the skull. ✓ (1)
- 3.3.4 • In *Homo sapiens* the foramen magnum is in a forward position ✓
 • therefore, are bipedal ✓
 • In the gorilla the foramen magnum is in a backward position ✓
 • therefore, are quadrupedal ✓/not bipedal (4)
- 3.3.5 • *Homo sapiens* have a larger brain ✓
 • and therefore, more intelligent ✓ (2)

- 3.4
- *Oldest fossils of Ardipithecus* found in Africa ONLY ✓
 - *Australopithecus* fossils found in Africa ONLY ✓
 - fossils of *Homo habilis* found in Africa ONLY ✓
 - *Oldest fossils of Homo erectus found in Africa* ✓
 - *Oldest fossils of Homo sapiens* found in Africa ✓
 - while the younger fossils of *Homo erectus* / *Homo sapiens* were found in other parts of the world ✓ (Any 5 x 1) (5)
- 3.5
- 3.5.1 Phylogenetic tree ✓ (1)
- 3.5.2 5 ✓ (1)
- 3.5.3 1 mya ✓ (1)
- 3.5.4 *Australopithecus africanus* ✓ (1)
- 3.5.5
- There is no direct line from *Homo erectus* to *Homo sapiens* ✓ because
 - *Homo erectus* and *Homo sapiens* both evolved from a *common ancestor* ✓ (2)
- 3.5.6 *Homo neanderthalensis* ✓ (1)
- 3.5.7 Prof. Lee Burger ✓ (1)
- 3.5.8 Sterkfontein Caves ✓/Cradle of Humankind Taung ✓ (2)
- [50]**

TOTAL SECTION B: 100
GRAND TOTAL: 150