



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P2

NOVEMBER 2018

FINAL MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 11 pages.

SECTION A**QUESTION 1**

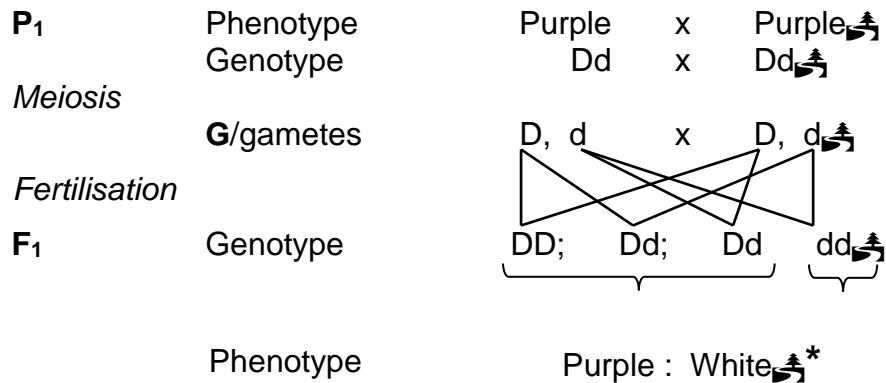
1.1	1.1.1	C		
	1.1.2	B		
	1.1.3	C		
	1.1.4	B		
	1.1.5	A		
	1.1.6	C		
	1.1.7	C		
	1.1.8	D		
	1.1.9	B	(9 x 2)	(18)
1.2	1.2.1	Hydrogen bonds		
	1.2.2	Genome		
	1.2.3	Cultural evidence		
	1.2.4	Speciation		
	1.2.5	Haemophilia		
	1.2.6	Foramen magnum		
	1.2.7	Alleles		
	1.2.8	Discontinuous variation		
	1.2.9	Gonosomes	(9 x 1)	(9)
1.3	1.3.1	A only		
	1.3.2	Both A and B		
	1.3.3	A only	(3 x	(6)
		2)		
1.4	1.4.1	D- Chromatid E- Centromere		(2)
	1.4.2	23 pairs		(1)
	1.4.3	(a) E (b) C/B		(1) (1)
	1.4.4	(a) Nucleus Mitochondrion (Mark first TWO only) (b) Double helix (c) (DNA) Replication		(2) (1) (9)
1.5	1.5.1	Phylogenetic tree/ cladogram		(1)
	1.5.2	An exoskeleton		(1)
	1.5.3	(a) S (b) T		(1) (1)
	1.5.4	(a) Trilobites (b) Helmetids (c) Tegopeltids (d) Naraoids	OR	(1) (1) (1) (1) (8)
			(b) Tegopeltids (c) Helmetids	

QUESTION 2

- 2.1 2.1.1 – Due to non-disjunction, Non-separation of a chromosome pair
 – during Anaphase
 – Two chromosomes moved to the one pole and
 – none moved to the other pole Any (3)
- 2.1.2 – Gamete **A** will have 24 chromosomes/an extra chromosome
 – and when it fertilises a normal ovum/gamete with 23
 chromosomes
 – the zygote will have 3 chromosomes at position 21/ 47 chromosomes (3)
- 2.1.3 (a) Prophase (1)
- (b) – Adjacent chromatids of homologous chromosomes cross
 – at a point called the chiasma
 – There is an exchange of DNA segments/genetic material (3)
- (c) – Crossing over introduces genetic variation in gametes
 – Genetic variation may result in favourable characteristics
 – that ensure a better chance of survival
 – when environmental conditions change
- OR**
- Crossing over introduces genetic variation in gametes
 – Genetic variation may result in unfavourable
 characteristics
 – that reduce the chance of survival
 – when environmental conditions change Any (3)
(13)
- 2.2 2.2.1 (a) Female without SCID (1)
 (b) Male with SCID (1)
 (c) $X^D X^d$ (2)
- 2.2.2 – He inherited the recessive allele X^d
 – from the mother/individual 4 (2)
(6)

- 2.3 2.3.1 (a) It allows for the production of organisms with desired characteristics/ high average milk yield
(Mark first ONE only) (1)
- (b) – It reduces genetic variation in offspring
– It results in no further genetic improvement
– It is expensive
– It may not be economical for commercial agriculture
(Mark first ONE only) Any (1)
- 2.3.2 LMJC 865 had a high average milk-production yield/ produced 78 litres per day/ had the desired characteristic (1)
- 2.3.3 – A diploid cell/ a cell with all the genetic information is needed
– An ovum is a haploid cell/ only contains half of the genetic information (2)
- 2.3.4 – The nucleus of an ovum is removed and replaced with the nucleus of a somatic donor cell/ diploid donor cell
– The zygote is stimulated for mitosis to occur
– The embryo is then placed into the uterus of an adult female
- OR**
- Plants may be cloned by vegetative reproduction/asexual reproduction /tissue culture/grafting
– A plant with the desired characteristics is selected
– A vegetative part of the “parent” plant structure is removed/(examples) and
– placed inside a growth medium/(examples)
– and allowed to grow Any 4 (4)
(9)
- 2.4 2.4.1 Purple (1)
- 2.4.2 – When purple-flowering plants and white-flowering plants are crossed
– all the offspring have purple flowers/have no white flowers (2)
- 2.4.3 – The two alleles for a characteristic
– separate during meiosis so that
– each gamete contains only one allele for that characteristic (3)

2.4.4



P₁ and
F₁
Meiosis and fertilisation

*Compulsory 1 + Any 5

OR



Meiosis

Fertilisation

Gametes	D	d
D	DD	Dd
d	Dd	dd

1 mark for correct gametes
1 mark for correct genotypes

F₁ Phenotype
P₁ and
F₁
Meiosis and fertilisation

Purple: White*

*Compulsory 1 + Any 5

(6)
(12)
[40]

QUESTION 3

- 3.1 3.1.1
- The jaw is large in the chimpanzee and small in *Homo sapiens*
 - The jaw/ palate is rectangular in the chimpanzee and rounded in *Homo sapiens*
 - Large spaces between the teeth in the chimpanzee and small/no spaces in *Homo sapiens*
 - Large canines/teeth in the chimpanzee and small canines/teeth in *Homo sapiens*
- Any 1 x 2 (2)

(Mark first ONE only)

- 3.1.2
- The diet changed from eating raw food in *Australopithecus*
 - to a diet of cooked food in *Homo sapiens*
- (2)

- 3.1.3 (a) A transitional species shows intermediate characteristics between two genera/species

OR

It has characteristics common to both the ancestor species and the species that follows (1)

- (b) The jaw is smaller than that of the chimpanzee but larger than that of *Homo sapiens*

OR

The canines/ teeth are smaller than those of the chimpanzee but larger than those of *Homo sapiens*

OR

The jaw/ palate shape is more rounded than that of the chimpanzee but less rounded than that of *Homo sapiens*

Any 1 x 2 (2)

(Mark first ONE only)**(7)**

- 3.2 3.2.1 – The bright colour pattern is associated with being poisonous
– thus reducing predation and
– improving the chances of survival (3)

- 3.2.2 – There is variation in the colour of kingsnakes✓
– Some are bright in colour✓/resemble the coral snakes and
– the others are dull in colour✓
– Those with dull colours are killed✓ by predators
– Those with bright colours are not eaten✓
– so they survive and reproduce,
– passing on the allele for bright colour to the next generation✓
Any 6 (6)
(9)

- 3.3 3.3.1 1900 (1)

3.3.2 $\left\{ \frac{80}{20} \right\} \times 100 = 400\%$
OR

$\left\{ \frac{(100-20)}{20} \right\} \times 100 = 400\%$ (3)

3.3.3 T

Natural selection	Artificial selection
The environment or nature is the selective force	Humans represent the selective force
Selection is in response to suitability to the environment	Selection is in response to satisfying human needs
Occurs within a species	May involve one or more species (as in cross breeding)

1 for Table + Any 2 x 2 (5)
(9)

(Mark first TWO only)

- 3.4 3.4.1 – They invade farm fields✓
– They outcompete the crop plants for space✓ Any (1)

- 3.4.2 (a) Type of herbicide ✓ (1)
(b) Time taken for development of resistance✓ (1)

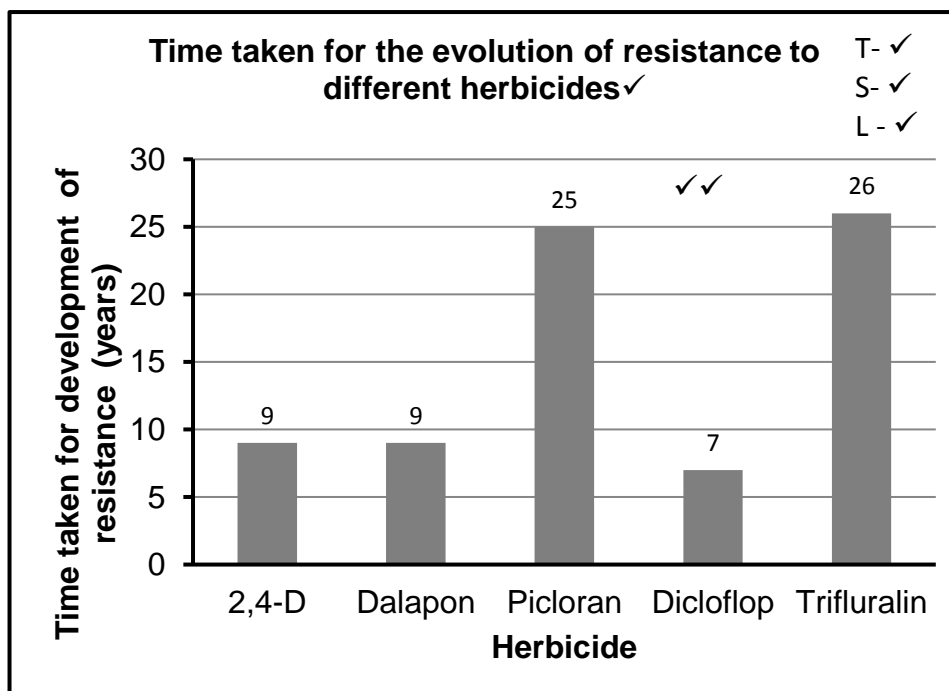
- 3.4.3 (a) Dicloflop✓ (1)
(b) Trifluralin✓ (1)

- 3.4.4 (a) – They would apply the herbicide to the weed✓ and
 – observe if the weed survives✓ over many generations (2)
- (b) – They used the same weed species as other weed species
 may have developed resistance to that herbicide✓
 – Each weed species may respond differently✓ to a herbicide

OR

- It allows for a single variable✓
 – to which all results can be attributed✓ (2)

3.4.5



Guideline for assessing the graph

Type: Bar graph drawn (T)	1
Title of graph	1
Correct: – Scale for Y-axis and (S) – Width and interval of bars on X-axis	1
Correct: – Label for X-axis and – Label and unit for Y-axis (L)	1
Plotting of bars	1- 1 to 4 bars plotted correctly 2- All 5 bars plotted correctly

(6)
(15)
[40]

TOTAL SECTION B: 80

SECTION C**QUESTION 4****Structure (S)**

- RNA is single stranded✓
- and is made up of nucleotides✓ which comprise:
- ribose✓ sugar
- phosphate✓ group
- nitrogenous bases✓ which are
- adenine, uracil, guanine and cytosine✓/ (A, U, G and C)
- The phosphate group is attached to the ribose sugar✓
- and the nitrogenous base is attached to the ribose sugar✓
- Bases on RNA are arranged in triplets✓
- as codons on mRNA✓
- and anticodons on tRNA✓
- tRNA has a clover-leaf✓/hairpin structure
- tRNA has a place of attachment for an amino acid✓

Any (9)

Involvement in protein synthesis (P)

- mRNA✓ forms
- during transcription✓/by copying the coded message from DNA
- and moves out of the nucleus✓
- and attaches to the ribosome✓
- During translation✓
- the anticodon matches the codon✓
- tRNA✓
- brings the required amino acid✓ to the ribosome
- Amino acids become attached by peptide bonds✓
- to form the required protein✓

Any (8)

Content: (17)
Synthesis: (3)
(20)**ASSESSING THE PRESENTATION OF THE ESSAY**

Criterion	Relevance (R)	Logical sequence (L)	Comprehensive (C)
Generally	All information provided is relevant to the question	Ideas are arranged in a logical/cause-effect sequence	All aspects required by the essay have been sufficiently addressed
In this essay in Q4	Only information relevant to the: - structure of RNA and - involvement of the different types of RNA in protein synthesis is given There is no irrelevant information	All the information regarding the - structure of RNA and - the involvement of the different types of RNA in protein synthesis is given in a logical manner	At least: - 6/9 correct points for the structure of RNA (S) - 5/8 for the involvement in protein synthesis (P)
Mark	1	1	1

TOTAL SECTION C: 20
GRAND TOTAL: 150