



# basic education

Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

## NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P2  
NOVEMBER 2018  
FINAL MARKING GUIDELINES- 21 November 2018

MARKS: 150

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21/11/2018

DEPARTMENT OF BASIC  
EDUCATION  
PRIVATE BAG X395, PRETORIA 0001  
2018 -11- 21  
APPROVED MARKING GUIDELINE  
PUBLIC EXAMINATION

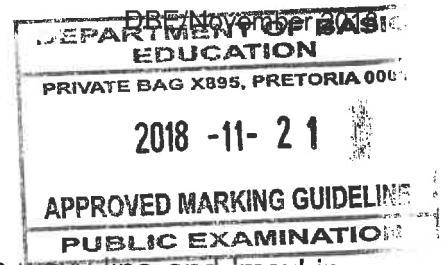
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These marking guidelines consist of 11 pages.

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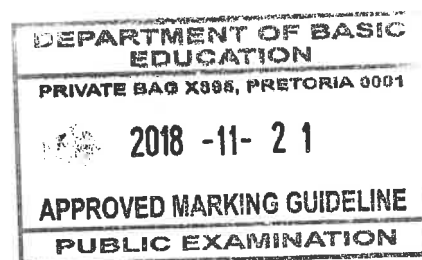
S. CHETTY  
INT MOD  
*[Signature]*



## 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.
18. **Code-switching of official languages (terms and concepts)**  
A single word or two that appear(s) in any official language other than the learner's 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. **Changes to the memorandum**  
No changes must be made to the memoranda. The provincial internal moderator must be consulted, who in turn will consult with the national internal moderator (and the Umalusi moderators where necessary).
20. **Official memoranda**  
Only memoranda bearing the signatures of the national internal moderator and the Umalusi moderators and distributed by the National Department of Basic Education via the provinces must be used.



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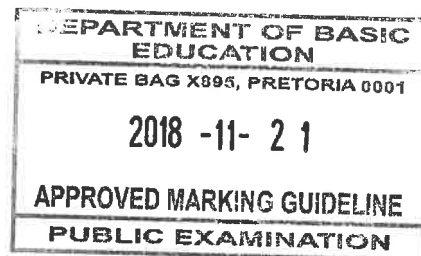
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**SECTION A**

**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) | <b>(18)</b> |
| 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 ✓ / Sex chromosomes   | (9 x 1) | <b>(9)</b>  |
| 1.3 | 1.3.1 | A only ✓✓   |         |             |
|     | 1.3.2 | Both A and B ✓✓   |         |             |
|     | 1.3.3 | A only ✓✓   | (3 x 2) | <b>(6)</b>  |
| 1.4 | 1.4.1 | D- Chromatid ✓<br>E- Centromere ✓   |         |             |
|     | 1.4.2 | 23 ✓ pairs  |         |             |
|     | 1.4.3 | (a) E ✓<br>(b) C ✓ / B  |         |             |
|     | 1.4.4 | (a) Nucleus ✓<br>Mitochondrion ✓<br><b>(Mark first TWO only)</b><br>(b) Double helix ✓<br>(c) (DNA) Replication ✓ |         |             |
| 1.5 | 1.5.1 | Phylogenetic tree ✓ / cladogram   |         |             |
|     | 1.5.2 | An exoskeleton ✓  |         |             |
|     | 1.5.3 | (a) S ✓<br>(b) T ✓  |         |             |
|     | 1.5.4 | (a) Trilobites ✓<br>(b) Helmetids ✓<br>(c) Tegopeltids ✓<br>(d) Naraooids ✓                                       |         |             |
|     |       | <b>OR</b>   |         |             |
|     |       | (b) Tegopeltids ✓<br>(c) Helmetids ✓  |         |             |



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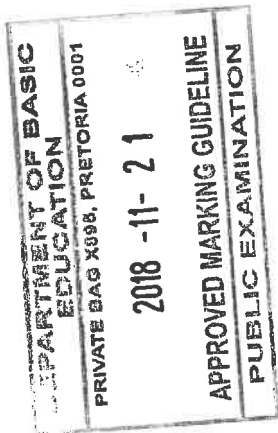
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**TOTAL SECTION A: 50**

Please turn over

**QUESTION 2**

- 2.1 2.1.1 – Due to non-disjunction✓/ Non-separation of a chromosome pair  
– during Anaphase I✓  
– 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 I✓ (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)**

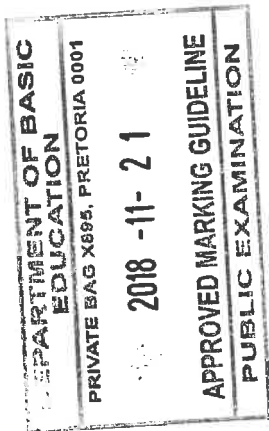


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- 2.3 2.3.1 (a) It allows for the production of organisms with desired characteristics✓/ high average milk yield (1)  
**(Mark first ONE only)**
- (b) – It reduces genetic variation✓ in offspring  
– It results in no further genetic improvement✓  
– 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)



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**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**

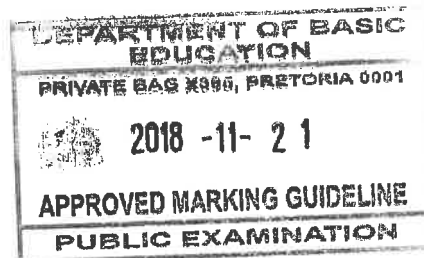
The canines/ teeth are smaller than those of the chimpanzee but larger than those of *Homo sapiens*✓✓

**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)**



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

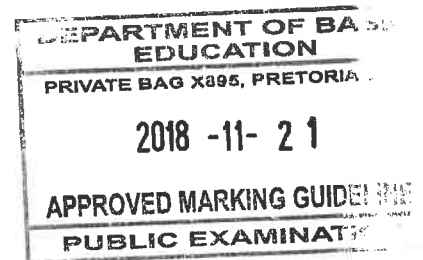
- 3.2.2 – There is variation in the colour of kingsnakes✓  
 – Some are bright in colour✓/resemble the coral snakes and  
 – the others are dull in colour✓  
 – Those with dull colours are killed✓ by predators  
 – Those with bright colours are not eaten✓  
 – so they survive✓ and reproduce,  
 – passing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

- 3.3 3.3.1 1900✓ (1)

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

OR

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



(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)

(Mark first TWO only) (9)

- 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)

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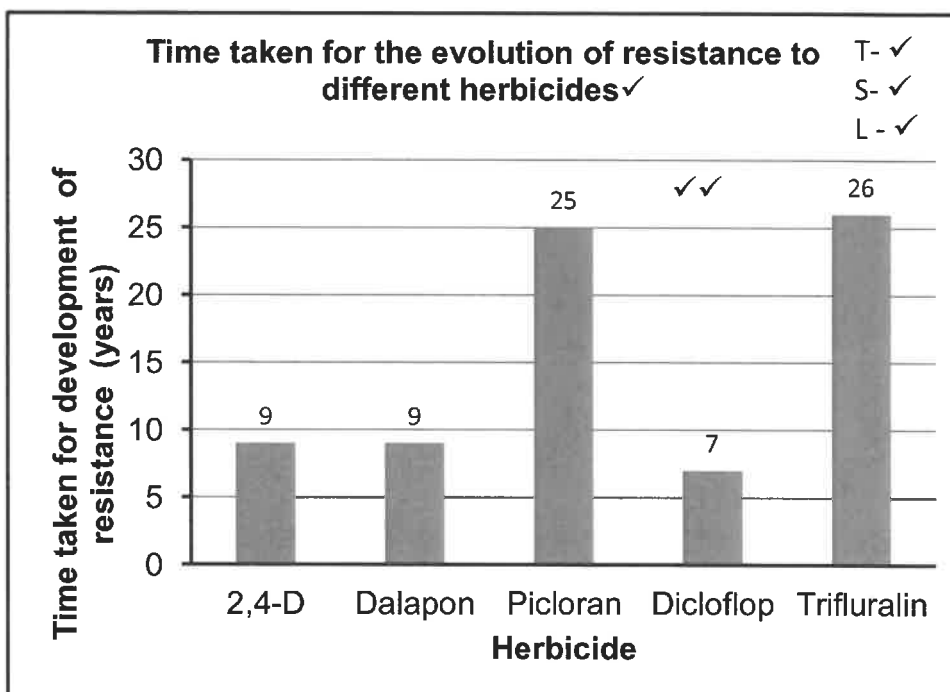
R

- 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✓ (2)  
 – to which all results can be attributed✓

3.4.5

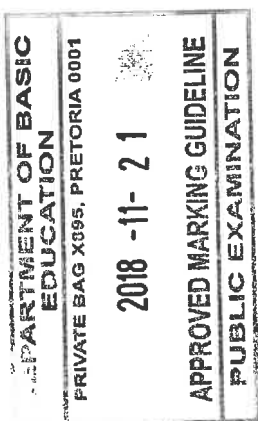


**Guideline for assessing the graph**

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]



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TOTAL SECTION B: 80

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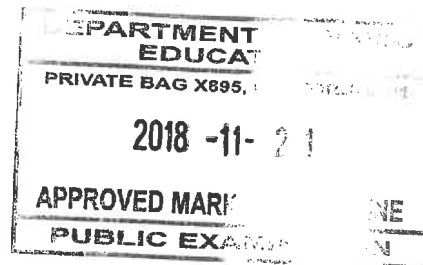
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**SECTION C**

**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)
<b>Generally</b>	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
<b>In this essay in Q4</b>	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: - <b>6/9</b> correct points for the structure of RNA ( <b>S</b> ) - <b>5/8</b> for the involvement in protein synthesis ( <b>P</b> )
<b>Mark</b>	1	1	1

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**TOTAL SECTION C: 20**  
**GRAND TOTAL: 150**

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