



# basic education

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

## **NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**LIFE SCIENCES P1**

**MEMORANDUM**

**FEBRUARY/MARCH 2011**

**MARKS: 150**

**This memorandum consists of 12 pages.**

**PRINCIPLES RELATED TO MARKING LIFE SCIENCES FEBRUARY/MARCH 2011**

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 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 is incorrect, do not credit. If sequence and links becomes correct again, resume credit.
9. **Non-recognized 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. Indicate that the candidate's numbering is wrong.
11. **If language used changes the intended meaning**  
Do not accept.
12. **Spelling errors**  
If recognizable 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 memo 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**  
Memorandum will allocate marks for units separately, except where it is already given in the question.
16. Be sensitive to the **sense of an answer, which may be stated in a different way.**
17. **Caption**  
Credit will be given for captions to all illustrations (diagrams, graphs, tables, etc.) except where it is already given in the question.
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 memoranda. In exceptional cases, the Provincial Internal Moderator will consult with the National Internal Moderator (and the External moderators if necessary).
20. 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 in the training of markers and in the marking.

**SECTION A****QUESTION 1**

- |     |       |   |         |             |
|-----|-------|---|---------|-------------|
| 1.1 | 1.1.1 | B✓✓   |         |             |
|     | 1.1.2 | C✓✓   |         |             |
|     | 1.1.3 | A ✓✓  |         |             |
|     | 1.1.4 | C✓✓   |         |             |
|     | 1.1.5 | D✓✓   |         |             |
|     | 1.1.6 | C✓✓   | (6 x 2) | <b>(12)</b> |
| 1.2 | 1.2.1 | Genome✓   |         |             |
|     | 1.2.2 | DNA profiling✓/fingerprint  |         |             |
|     | 1.2.3 | Acrosome✓   |         |             |
|     | 1.2.4 | Ovulation✓  |         |             |
|     | 1.2.5 | Gestation✓  |         |             |
|     | 1.2.6 | Vas deferens✓/sperm duct  |         |             |
|     | 1.2.7 | Prolactin✓  |         | <b>(7)</b>  |
| 1.3 | 1.3.1 | Both A and B✓✓/A and B/Both   |         |             |
|     | 1.3.2 | B only✓✓/B  |         |             |
|     | 1.3.3 | B only✓✓/B  |         |             |
|     | 1.3.4 | A only✓✓/A  |         |             |
|     | 1.3.5 | Both A and B✓✓/A and B/Both   | (5 x 2) | <b>(10)</b> |
| 1.4 | 1.4.1 | To determine whether sugar does have an influence on the germination of pollen grains✓<br>Distilled water was used as a control✓  |         | (2)         |
|     | 1.4.2 | Carry out similar investigations using pollen of other plants✓<br>Repeat the investigation✓<br>The number of pollen for each concentration must be the same✓<br>Use more slides for each sugar concentration✓<br>Use a bigger range of sugar concentration✓<br><b>(Mark THREE only)</b> |         | (3)         |
|     | 1.4.3 | As the sugar concentration increases✓ the number of pollen grains that germinates also increases✓   |         | (2)         |
|     |       |   |         | <b>(7)</b>  |

- |     |       |   |                   |
|-----|-------|---|-------------------|
| 1.5 | 1.5.1 | 46✓/23 pairs  | (1)               |
|     | 1.5.2 | Man✓  | (1)               |
|     | 1.5.3 | One✓ large chromosome✓ /one big and one small/<br>chromosomes of pair 23 are different  | (2)               |
|     | 1.5.4 | On chromosome pair no. 21✓ a person with Down's syndrome will<br>have 3✓chromosomes instead of 2 chromosomes in each<br>cell/47 chromosomes instead of 46 | (2)<br><b>(6)</b> |
| 1.6 | 1.6.1 | Haemophilia occurred in males✓ only✓  | (2)               |
|     | 1.6.2 | (a) $X^hY$ ✓✓   | (2)               |
|     |       | (b) $X^HX^h$ ✓✓   | (2)               |
|     |       | (c) $X^HY$ ✓✓   | (2)               |
|     |       |   | <b>(8)</b>        |

**TOTAL SECTION A: 50**

**SECTION B****QUESTION 2**

- 2.1 2.1.1 A - Chromatid✓/chromosome  
B – Centromere✓  
C – Spindle fibre✓/thread (3)
- 2.1.2 (a) Metaphase 2✓ (1)  
(b) Prophase I✓ (1)
- 2.1.3 Diagram 2, Diagram 3, Diagram 1, Diagram 4✓✓ (2)

2.1.4

| Meiosis I  | Meiosis II  |
|--|---|
| - Crossing over takes place✓   | - No crossing over takes place✓                         |
| - In metaphase the chromosomes align on the equator in homologous pairs✓ | - In metaphase chromosomes align singly✓ on the equator |
| - Reduction division✓  | - No reduction division✓                                |
| - During anaphase whole chromosomes✓ move towards the poles              | - During anaphase chromatids✓ move towards the pole     |

**(Mark first THREE only)**

any 3 x 2 + 1 table

(7)

- 2.1.5 Crossing over✓  
Pieces of chromatids/groups of genes are exchanged✓ between homologous chromosomes (2)
- Random✓/independent assortment of chromosomes  
Maternal and paternal chromosomes assort themselves randomly/independently on either side of the equator✓ during metaphase (2)
- (18)**

- 2.2 2.2.1 M – DNA✓  
R – Ribosome✓ (2)
- 2.2.2 AGT✓✓ (2)
- 2.2.3 Transcription✓ (1)
- 2.2.4 (a) Threonine✓✓ (2)  
(b) CCG✓✓ (2)  
(c) Anticodon✓ (1)  
(d) A different protein may form because it has cysteine✓ instead of serine✓/have different amino acids (2)
- (12)**  
**[30]**

**QUESTION 3**

- 3.1 3.1.1 A – Fallopian tube✓  
B – Ovary✓  
C – Vagina✓ (3)
- 3.1.2 - Encloses✓ and protects✓ the developing embryo/foetus  
- Forms part of the placenta✓  
- Which provides for the nutrition✓/ gaseous exchange/  
excretion of the embryo  
- Allows for implantation✓/attachment of the embryo  
- Contracts during labour for child birth✓ (3)
- (Mark first THREE only)**
- 3.1.3 (a) The sperms will be prevented from reaching the ovum✓/  
prevents the ovum from travelling along the Fallopian  
tube (1)
- (b) The egg produced in the other ovary✓ can still be fertilised✓  
in the other Fallopian tube (2)
- (9)**
- 3.2 3.2.1 Gossypol✓ acts as a contraceptive✓ in males✓  
**OR**  
Gossypol✓ does not act as a contraceptive✓ in males✓  
**OR**  
(Gossypol✓ has no effect✓ on male fertility✓)  
**OR**  
(Gossypol✓ has an effect✓ on male fertility✓)  
**OR**  
(Gossypol✓ increases✓ male fertility✓)  
**OR**  
(Gossypol✓ decreases✓ male fertility✓) (3)
- 3.2.2 - Determine the sample size✓  
- Find volunteers✓  
- and a comparable group✓ as a control  
- Design a way of recording the data✓ (4)
- 3.2.3 (a) Number of sperm✓ (1)
- (b) Amount of Gossypol ✓ (1)
- 3.2.4 (a) - Men can also take the responsibility for contraception✓  
- Men don't have to use a condom✓ during intercourse  
- Control/lower population growth✓ (2)
- (Mark first TWO only)**
- (b) - Could have side effects✓/effects not yet known  
- Against some people's religion to use contraceptive✓  
- Some men don't want to take responsibility for  
contraception✓/women are responsible for contraception (2)
- (Mark first TWO only)** **(13)**

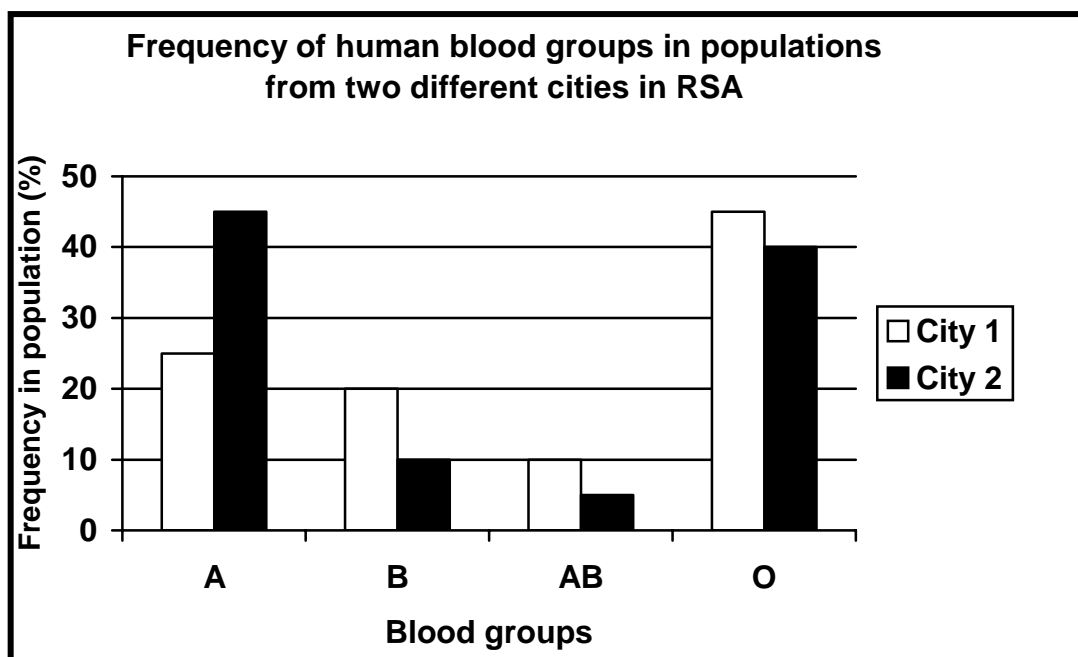
- 3.3.1 A – Petal✓  
B – Anther✓  
D – Stigma✓ (3)
- 3.3.2 - A pollen tube✓ germinates/grows out of the pollen grain  
- The pollen tube contains the tube nucleus and 2 sperm cells✓  
- The tube nucleus/vegetative nucleus determines the growth direction✓ of the pollen tube  
- The pollen tube grows down through the style✓/to the ovule  
- It enters through the micropyle✓ and opens to release the male nucleus/sperms✓ any (3)
- 3.3.3 (a) Seed✓ (2)  
(b) Fruit✓/fruit wall/pericarp (8)  
[30]

**TOTAL SECTION B: 60**

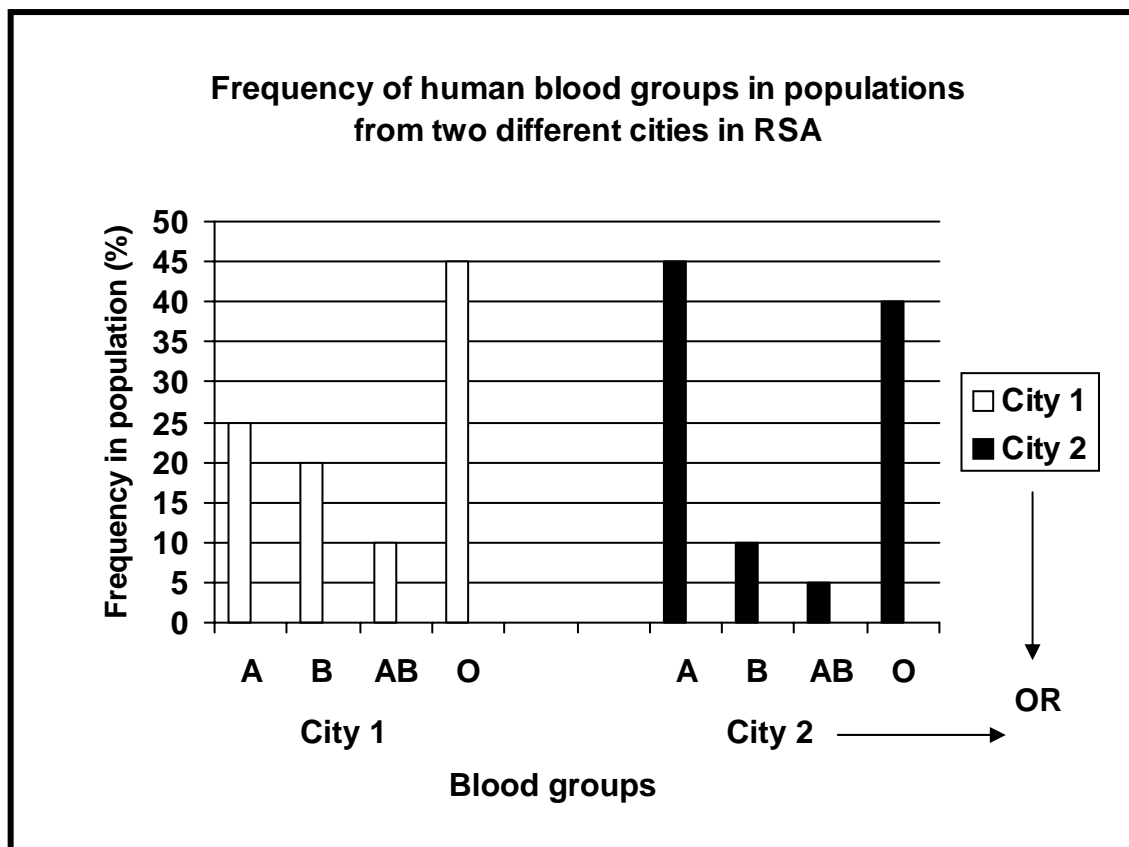


**SECTION C****QUESTION 4**

- 4.1
- Reduce the need for the use of chemicals✓/pesticides because the resistance of crops to pests has been increased✓/less harmful to the environment
  - Selecting the best genes to produce better resistant crops✓/stronger offspring to withstand harsh environmental conditions✓
  - Using specific genes to increase crop yields✓/life stock improvement for food security✓
  - Selecting genes to increase shelf life✓ of plant products so that there is minimal waste✓
  - Selecting genes that delay/accelerate ripening of fruits✓ to meet the demand✓ locally and internationally
  - Using specific genes to improve nutritional value✓ of food for better health✓
  - Using specific genes to introduce new traits in crops✓ to suit specific needs✓ of a population (e.g. to increase vitamin A in food) any (3 x 2) **(6)**
- (Mark first THREE x 2 only and not random points )**
- 4.2
- 4.2.1 (a) O✓ (1)
- (b) AB✓ (1)



OR

**Rubric for the mark allocation of the graph**

|  |  |
|--|--|
| Correct type of graph                          | 1  |
| Caption for graph                              | 1  |
| Correct label for X-axis                       | 1  |
| Correct label for Y-axis including <b>unit</b> | 1  |
| Graphs labelled/key provided for 2 graphs      | 1  |
| Appropriate width and interval of bars         | 1  |
| Appropriate scale for Y-axis                   | 1  |
| Drawing of graphs                              | 1 – 1 to 4 bars drawn correctly<br>2 – 4 to 7 bars drawn correctly<br>3 – all 8 bars drawn correctly |

(10)

(12)

**NOTE:**

If the wrong type of graph is drawn: marks will be lost for 'correct type of graph'.  
If graphs are not drawn on the same system of axes, mark the first graph only using the given criteria.

4.3

**P<sub>2</sub>**    phenotype    Black x Black✓  
                  genotype    Bb   x   Bb✓

*Meiosis*

**Gametes**                    B, b   x   B, b ✓

*Fertilisation*

**F<sub>2</sub>**    genotype    BB   Bb   Bb   bb✓  
                  phenotype    Black and    White✓

Parents and offspring✓/P<sub>2</sub> & F<sub>2</sub>  
 Meiosis and fertilisation✓

| gametes | B  | b  |
|---------|----|----|
| B       | BB | Bb |
| b       | Bb | bb |

1 mark for correct gametes  
 1 mark for correct genotypes

(7)

## 4.4 Advantages of cloning

- Producing individuals with desired traits✓to eliminate unwanted characteristics✓
  - Better yield✓to increase the amount of food✓for a large population
  - Resistant to diseases✓to save on the use of pesticides and herbicides✓
  - Organisms produced in a shorter time✓to increase yield✓  
Saving endangered species✓no need for mating partners✓/looking for partners
  - Producing body parts✓reducing rejection of transplanted parts✓
  - Produce offspring✓ for organisms that are infertile and cannot have their own offspring✓
  - Reproduction✓ is not seasonally dependent✓ (3 x 2) (6)
- (Mark FIRST THREE only)**

## Disadvantages of cloning

- Objection✓/religious beliefs to interfering with God's/Supreme Being's creation✓/nature
  - Reducing the gene pool ✓by reducing variation✓/reduces genetic diversity
  - Cloned organisms may have developmental/morphological problems✓ and not survive long✓
  - Costly process✓ not all farmers/people/government's can afford it✓
  - May generate more experimental waste✓causing ethical✓ issues around disposal of waste
  - May lead to killing of clones✓ to obtain spare body parts✓ (3 x 2) (6)
- (Mark THREE only)**

Content (12)

**ASSESSING THE PRESENTATION OF THE ESSAY**

| Marks | Description   |
|-------|---|
| 3     | Discussed all THREE aspects with no irrelevant information                      |
| 2     | Discussed TWO or THREE aspects OR contains some irrelevant information          |
| 1     | Discussed ONE or TWO aspect OR contains much irrelevant information             |
| 0     | Not attempted/nothing written other than question number/no correct information |

**Synthesis** (3)  
**(15)**

**TOTAL SECTION C: [40]**  
**GRAND TOTAL: 150**