basic education

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

# NATIONAL SENIOR CERTIFICATE

## GRADE 12

## LIFE SCIENCES P1

## FEBRUARY/MARCH 2016

## MEMORANDUM

**MARKS: 150**

**This memorandum consists of 10 pages.**

## 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 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. **Changes to the memorandum**
No changes must be made to the memoranda without consulting the provincial internal moderator 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.

## SECTION A

## QUESTION 1

| | | | | |
|---|---|---|---|---|
| 1.1 | 1.1.1 | C✓✓ | | |
| | 1.1.2 | D✓✓ | | |
| | 1.1.3 | C✓✓ | | |
| | 1.1.4 | B✓✓ | | |
| | 1.1.5 | B✓✓ | | |
| | 1.1.6 | C✓✓ | | |
| | 1.1.7 | A✓✓ | | |
| | 1.1.8 | D✓✓ | | |
| | 1.1.9 | B✓✓ | | |
| | 1.1.10 | A✓✓ | (10 x 2) | **(20)** |
| 1.2 | 1.2.1 | Vivipary✓/Viviparous | | |
| | 1.2.2 | Centrioles✓/Centrosome | | |
| | 1.2.3 | Geotropism✓/Gravitropism | | |
| | 1.2.4 | Carbon footprint✓ | | |
| | 1.2.5 | Puberty✓ | | |
| | 1.2.6 | Stimulus✓ | | |
| | 1.2.7 | Grommets✓ | | |
| | 1.2.8 | Pinna✓ | (8 x 1) | **(8)** |
| 1.3 | 1.3.1 | B only✓✓ | | |
| | 1.3.2 | Both A and B✓✓ | | |
| | 1.3.3 | B only✓✓ | | |
| | 1.3.4 | None✓✓ | (4 x 2) | **(8)** |
| 1.4 | 1.4.1 | (a) A✓ - penis✓ | | (2) |
| | | (b) E✓ - testes✓ | | (2) |
| | 1.4.2 | (a) D✓ and E✓<br>**(Mark first TWO only)** | | (2) |
| | | (b) B✓ and C✓<br>**(Mark first TWO only)** | | (2)<br>**(8)** |
| 1.5 | 1.5.1 | (a) E✓ | | (1) |
| | | (b) A✓ | | (1) |
| | | (c) C✓ | | (1) |
| | 1.5.2 | F✓ - motor neuron✓ | | (2) |
| | 1.5.3 | D to E✓ | | (1)<br>**(6)** |

**TOTAL SECTION A: 50**

## SECTION B

## QUESTION 2

2.1 2.1.1 (a) Round window✓ (1)

(b) Cochlea✓ (1)

2.1.2 Cristae✓ (1)

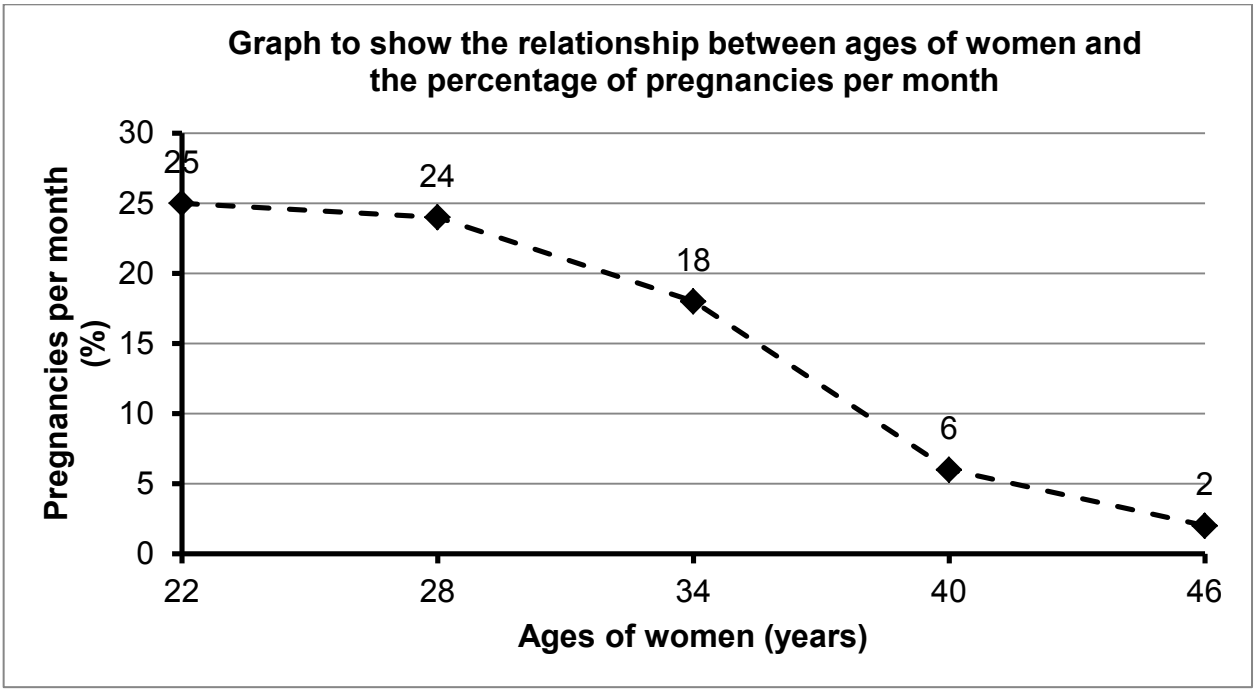
2.1.3 (a)
- Impulses from the cochlea cannot be transmitted to the brain✓
- and therefore hearing will not occur✓ (2)

2.1.4 (b)
- Part A will not be able to vibrate✓
- The round window will not absorb the sound waves✓ from the cochlea
- and hearing will be affected✓ (Any 2) (2)

**(7)**

2.2
- Mucus in the middle ear✓
- will lead to the blockage of the Eustachian tube✓
- which will not be able to equalise the pressure✓ in the middle ear
- resulting in pressure on the tympanic membrane✓
- that may cause the tympanic membrane to burst✓
- leading to hearing loss✓ (Any 4) **(4)**

2.3 2.3.1




***Mark allocation of the graph***

| Criteria | Mark Allocation |
|---|---|
| Correct type of graph drawn for the pregnancies per month only | 1 |
| Title of graph including the two variables (Age of women and pregnancies per month) | 1 |
| Correct label and unit for X-axis and Y-axis | 1 |
| Correct scale for X-axis and Y-axis | 1 |
| Drawing of the graph | 0: No points plotted correctly<br>1: 1 to 4 points plotted correctly<br>2: All 5 points plotted correctly |

**NOTE:**
If axes are transposed: marks will be lost only for labelling of X-axis and Y-axis

(6)

2.3.2 The older the women, the higher the chances of having miscarriages✓✓

**OR**

The younger the women, the lower the chances of having miscarriages✓✓ (2)

2.3.3 50% x 12✓ = 6✓

**OR**

$\frac{50}{100}$ x 12✓ = 6✓ (2)

**(10)**

| | | | | |
|---|---|---|---|---|
| 2.4.1 | 2.4.1 | - As a result of the blocked Fallopian tube✓<br>- the sperm cannot reach the ovum✓<br>- therefore fertilisation cannot take place✓ | (Any 2) | (2) |
| | 2.4.2 | (a) FSH✓/follicle stimulating hormone<br>**(Mark first ONE only)** | | (1) |
| | | (b) Oestrogen✓<br>**(Mark first ONE only)** | | (1) |
| | 2.4.3 | - A zygote✓ is formed<br>- which divides by mitosis✓<br>- forming a ball of cells✓<br>- called the morula✓<br>- which further divides to form a hollow ball of cells✓ | (Any 4) | (4) |
| | 2.4.4 | - Progesterone levels would fall✓<br>- The endometrium would no longer be maintained✓<br>- A miscarriage would occur✓ | | (3)<br>**(11)** |
| 2.5 | 2.5.1 | Metaphase I✓ | | (1) |
| | 2.5.2 | - Crossing over has taken place✓<br>- and genetic material was exchanged ✓ | | (2) |
| | 2.5.3 | Anaphase II✓ | | (1) |
| | 2.5.4 | - The spindle fibres contract✓<br>- The centromeres split✓<br>- and pull the daughter chromosomes✓/chromatids<br>- to the opposite poles of the cells✓<br>- Cytokinesis begins✓ | (Any 3) | (3) |
| | 2.5.5 | Testes✓/seminiferous tubules<br>**(Mark first ONE only)** | | (1)<br>**(8)**<br>**[40]** |

## QUESTION 3

3.1 3.1.1 (a) ADH✓/antidiuretic hormone (1)

(b) Hypothalamus✓/Pituitary gland (1)

(c) Kidneys✓ (1)

3.1.2
- An increase in ADH causes the walls of the kidney tubules✓
- to become more permeable✓ to water
- More water is reabsorbed✓
- and the blood volume increases✓
- Less urine is produced✓
- and the urine is more concentrated✓ (Any 4) (4)

**(7)**

3.2 3.2.1 Pancreas✓ (1)

3.2.2

| Insulin A | Insulin B |
|---|---|
| Glucose uptake peaks at a higher level✓/around 7 mg/kg/min | Glucose uptake peaks at lower level✓/around 1 mg/kg/min |
| All glucose uptake occurs in a short period of time✓/the first 5 hours | Glucose uptake is gradual✓/ sustained over a period of 24 hours |
| The initial uptake of glucose rises rapidly to a maximum within the first few hours✓ | The initial uptake of glucose rises slowly to the maximum over 5 hours✓ |

TABULATION IS NOT REQUIRED (Any 2 x 2) (4)
**(Mark first TWO only)** **(5)**

3.3 3.3.1 (a) Amount of thyroxin✓ (1)

(b) Body weight✓ (1)

3.3.2
- Same number of rats in each group✓
- All rats were of the same species✓
- All groups were investigated for the same period of time✓
- All rats were the same gender✓
- All groups were weighed after the same interval✓ (Any 3) (3)

**(Mark first THREE only)**

3.3.3 Group A✓ (1)

3.3.4
- Low thyroxin levels✓
- will lead to low metabolic rate✓
- Therefore the energy from the diet is used very slowly✓
- and more organic compounds are stored✓ (Any 3) (3)

3.3.5 Group B✓ (1)

3.3.6
- These rats have high levels of thyroxin in their blood✓
- therefore pituitary gland will not be stimulated✓to secrete TSH (2)

**(12)**

3.4 3.4.1
- Poor infrastructure✓
- Climate change✓
- Wastage✓
- Pollution of water sources✓ (Any 2) (2)

**(Mark first TWO only)**

3.4.2
- The need of water for irrigation will be reduced✓ (1)

3.4.3
- Decreased production✓
- will lead to loss of profit✓ (2)

3.4.4
- More revenue for fixing poor infrastructure✓/building dams
- Less water wastage✓by individuals and companies (2)

**(Mark first TWO only)** **(7)**

3.5 3.5.1 (a)
- Invasive alien plants reduce food security✓
- since they grow rapidly and invade land✓
- that could be used to grow crops✓ (3)

(b)
- Invasive alien plants reduce water availability✓
- since they use more water✓ (2)

3.5.2 (a)
- The new organism may become a pest itself✓/it may feed on indigenous plants instead of the targeted alien plant
- since no natural enemy for it was brought into the area✓ (2)

(b)
- Some parts that are left behind✓
- can regrow✓/will cost more money to remove them again (2)

**(9)**
**[40]**

**TOTAL SECTION B: 80**

## SECTION C

## QUESTION 4

Plant stems response to unilateral light
- Plant stems response to light is positively phototropic✓
- Auxins✓
- produced in the tip of the stem✓
- move away from unilateral light✓
- so that there is a high concentration of auxins on the darker side✓
- which stimulates growth✓/cell division/cell elongation
- The low concentration of auxins on the side exposed to light✓
- inhibits growth✓
- This uneven growth✓
- causes the stem to bend towards the light✓ Max 7

How humans receive and interpret light stimuli
- Light enters the eye ✓
- through the cornea✓
- which refracts the light✓
- It then passes through the aqueous humour✓
- and the pupil✓
- The size of the pupil is adjusted by the iris✓
- to regulate the amount of light that enters the eye✓
- The light then passes through the lens✓
- which also refracts the light✓
- It then passes through the vitreous humour✓
- and reaches the retina✓
- which has the photoreceptors✓/rods and cones which convert the light stimulus into a nerve impulse Max 10 (10)

Content: (17)
Synthesis: (3)
**(20)**

## ASSESSING THE PRESENTATION OF THE ESSAY

| Relevance | Logical sequence | Comprehensive |
|---|---|---|
| All information provided is relevant to the question | Ideas arranged in a logical/ cause-effect sequence | Answered all aspects required by the essay in sufficient detail |
| All the information provided is relevant to plant stems' response to unilateral light and how humans receive and interpret light stimuli.<br><br>No irrelevant information. | All the information regarding how plant stems respond to unilateral light and how humans receive and interpret light stimuli are arranged in a logical manner. | At least the following points should be included:<br>- Plant response to unilateral light (**4/7**)<br>- How humans receive and interpret light stimuli (**7/10**) |
| 1 mark | 1 mark | 1 mark |

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