basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P1

NOVEMBER 2015

MEMORANDUM

MARKS: 150

This memorandum consists of 12 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 the 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	A✓✓		
	1.1.2	C✓✓		
	1.1.3	C✓✓		
	1.1.4	A✓✓		
	1.1.5	C✓✓		
	1.1.6	C✓✓		
	1.1.7	C✓✓		
	1.1.8	D✓✓		
	1.1.9	B✓✓		
	1.1.10	C✓✓	(10 x 2)	**(20)**
1.2	1.2.1	Medulla oblongata✓		
	1.2.2	Homeostasis✓		
	1.2.3	Abscisic acid✓/ABA		
	1.2.4	Meninges✓		
	1.2.5	Aldosterone✓		
	1.2.6	Ozone✓/O_3		
	1.2.7	Testosterone✓/FSH/LH		**(7)**
1.3	1.3.1	Both A and B✓✓		
	1.3.2	B only✓✓		
	1.3.3	A only✓✓		
	1.3.4	B only✓✓		
	1.3.5	Both A and B✓✓	(5 x 2)	**(10)**
1.4	1.4.1	(a) A✓ - ciliary muscle✓		(2)
		(b) C✓ - iris✓		(2)
		(c) D✓ - cornea✓		(2)
	1.4.2	Accommodation✓		(1)
	1.4.3	Diagram 2✓		(1) **(8)**
1.5	1.5.1	Phototropism✓		(1)
	1.5.2	Light✓/Sunlight/Radiant energy		(1)
	1.5.3	Auxins✓/ IAA/ Indole acetic acid		(1)
	1.5.4	Inhibit ✓		(1)
	1.5.5	Apical dominance✓		(1) **(5)**

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 2.1.1 (a) Eustachian tube✓ (1)

(b) Round window✓ (1)

(c) Cochlea✓ (1)

2.1.2
- Air will not be taken in✓/released
- to equalise pressure✓
- on both sides of the tympanic membrane✓
- Tympanic membrane/ ossicles may not vibrate freely✓
- This may lead to the tympanic membrane bursting✓and
- therefore could lead to hearing loss✓/deafness/ pain (Any 4) (4)

2.1.3 Changes in the direction and speed of movement:

- Causes the endolymph to move✓ in part D/semi-circular canals
- The cristae✓
- found in the ampulla ✓are stimulated
- and converts the stimulus into an impulse✓
- which is transmitted via the auditory nerve✓/ vestibular nerve
- to the cerebellum✓
- from which impulses are transmitted via motor neurons✓
- to the skeletal muscles✓/effector to restore balance of the body

(Any 5) (5)
(12)

2.2 2.2.1 (a) Chromosome✓ (1)

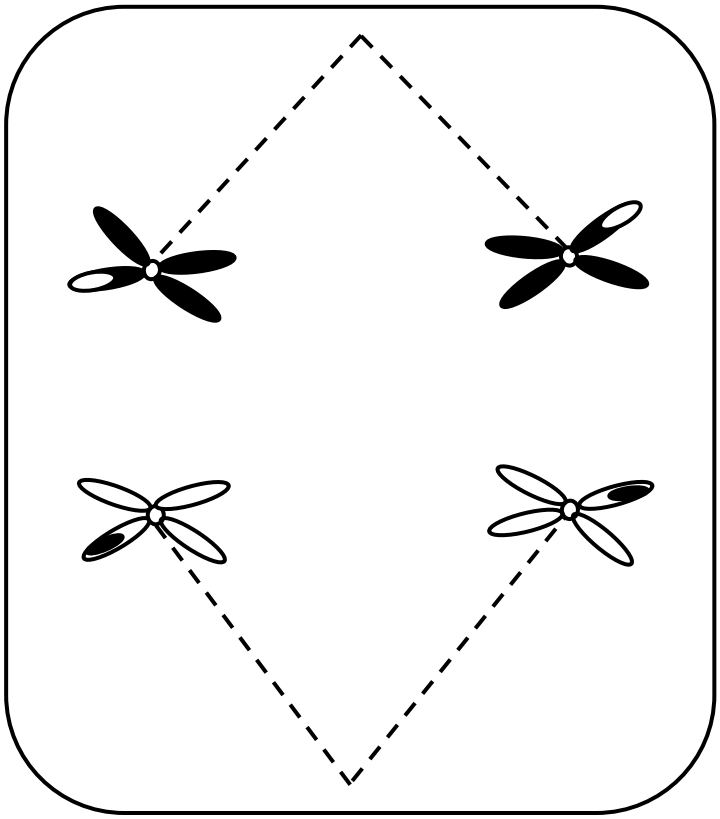
(b) Spindle fibre✓ (1)

(c) Centromere✓ (1)

2.2.2 Metaphase II✓ (1)

2.2.3
- Chromosomes lying independently✓/singly
- at the equator✓ (2)

2.2.4



Mark allocation:

C - Shows **4** chromosomes✓✓ (not chromatids)
S - Shows separation✓ of genetic material
D - Correct variation shown in the chromosomes✓(shading on the chromosomes must be complementary)
(Use the letters for marking process) (4)
(10)

2.3 2.3.1
- Seek permission✓/ethical clearance
- Deciding on the sample size✓
- Deciding on the equipment for measuring✓
- Deciding on the age-group of the participants✓
- Deciding on using women with regular menstrual cycles✓
- Deciding on how to record the results✓
- Decide on the duration✓
- Learning how to use the equipment✓ (Any 2) (2)

(MARK FIRST TWO ONLY)

2.3.2 (a)
- The follicles decreased in size✓
- as ovulation had taken place✓
- The resulting corpus luteum became smaller✓
- because fertilisation did not take place✓ (Any 3) (3)

(b)
- The production of FSH✓
- will be inhibited✓
- which will stop/inhibit the development/growth of a follicle✓
- therefore the follicle size will remain the same✓ (Any 3) (3)

(8)

2.4 2.4.1 (a) Medulla oblongata✓ (1)

(b) Corpus callosum✓ (1)

(c) Cerebellum✓ (1)

2.4.2
- Controls all voluntary activities✓/example
- It contains centres that receives and interprets all the sensations✓/example
- It is the seat of higher mental functions✓/example
- Influences emotional behaviour/ example (Any 3) (3)

(MARK FIRST THREE ONLY) **(6)**

2.5
- Every organ and gland is controlled by two sets of nerves✓/double innervations
- that act antagonistically✓
- to control involuntary events✓/brings about homeostasis
- Sympathetic✓nerves
- generally stimulates a response✓/example
- Parasympathetic✓nerves
- generally inhibits a response✓/example (Any 4) **(4)**

[40]

QUESTION 3

3.1
- Receptor cells✓
- in the carotid artery✓/aorta are stimulated
- to send impulses to the medulla oblongata✓ in the brain
- which then **stimulates the heart**✓
- to beat faster✓
- and the breathing muscles ✓/example
- to contract more actively✓
- This increases the rate/ depth of breathing✓
- More CO_2 is taken to and exhaled from the lungs✓returning the CO_2 level in the blood to normal (Any 6) **(6)**

3.2 3.2.1 Comparison of the blood glucose level of two people✓ over 5 hours✓/before and after ingesting glucose (2)

3.2.2 (145 – 125)✓
(Accept numbers in range 144 -146 for the first value and 124 -126 for the second value)

= 20✓ mg/100 cm^3 (2)
(Accept answer according to the values given by learner)

3.2.3 Accept any answer from 1,7 to 1,9✓ hours /102 – 114minutes/ 1h42min – 1h54min (1)

3.2.4 (a) Thabiso✓ (1)

(b)
- His glucose level is higher than the normal range✓
- It takes longer for his glucose level to come down to its original level✓ (Any 1) (1)

(MARK FIRST ONE ONLY)

3.2.5
- When his glucose level is high✓/ 99/98mg/100cm^3
- insulin✓is secreted into the blood
- to convert excess glucose into glycogen ✓ in the liver
- and to stimulate the cells to absorb more glucose✓
- thus decreasing the blood glucose level✓ (Any 4) (4)

(11)

3.3 3.3.1 Poaching✓ (1)

3.3.2
- Deforestation✓
- Urbanisation✓
- Mining ✓
- Agriculture✓
- Veld fires✓
- Building✓
- Pollution✓
- Introduction of alien species✓ (Any 1) (1)

(MARK FIRST ONE ONLY)

3.3.3
- Increasing human population✓
- Increasing unemployment✓/poverty
- Increased prices of bush-meat✓/greed
- Increased demand✓
- Poor protection of wildlife✓ (Any 2) (2)

(MARK FIRST TWO ONLY)

3.3.4
- Disturbs the ecosystem✓
- because food chains are affected✓
- leading to the extinction of some species✓ in the ecosystem
- and will eventually lead to loss of biodiversity✓ (Any 3) (3)

3.3.5
- Very old animals have passed the reproductive stage in their lives✓/old animals are at the end of lifespan
- therefore may not significantly influence the size of the population✓
- Weak animals have a short lifespan✓
- and will not contribute to the survival of the population✓
- Killing old and weak animals may prevent a population from exceeding carrying capacity✓
- Genes causing weakness will be removed from the gene pool✓

(Any 3) (3)
(10)

3.4 3.4.1
- Food security refers to the access✓
- of adequate✓/safe/nutritious food
- to all people at all times✓ (Any 2) (2)

3.4.2
- Price is added to cover the cost of transportation✓ over long distances
- No competition✓ between dealers in rural areas
- Decrease demand✓ for goods in rural areas (Any 1) (1)

(MARK FIRST ONE ONLY)

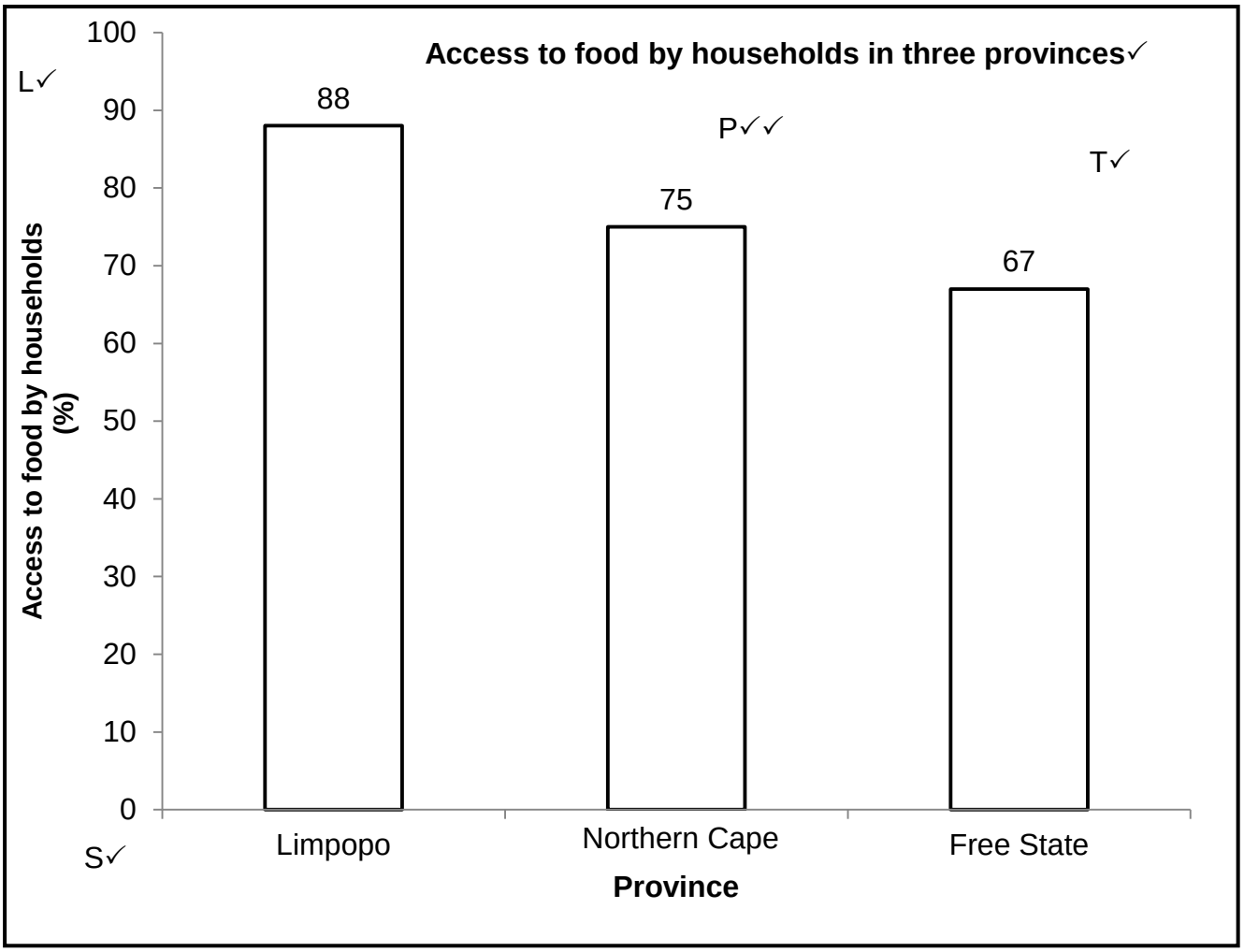
3.4.3
- Decreased need to buy food✓
- Selling of excess produce to earn some money✓ (2)

(MARK FIRST TWO ONLY)

3.4.4
- Making people aware of the benefits of farming✓
- Providing resources✓/example
- Developing skills for farming✓
- Providing incentives✓ to encourage farming (Any 2) (2)

(MARK FIRST TWO ONLY)

3.4.5



Mark allocation of the graph

Criteria	Mark Allocation
Bar graph drawn (T)	1
Title of graph	1
Correct scale for X-axis (equal width and spacing of the bars) and Y-axis (S)	1
Correct label and unit for X-axis and Y-axis (L)	1
Plotting of the bars (P)	0: No bars plotted correctly 1: 1 to 2 bars plotted correctly 2: All 3 bars plotted correctly

NOTE:
If a line graph is drawn – marks will be **awarded** for the 'title and label for X and Y axes' only
If a histogram is drawn – marks will be **lost** for the 'type of graph and correct scale' only

(6)
(13)
[40]

TOTAL SECTION B: 80

SECTION C

QUESTION 4

Structural suitability of the sperm cell for internal fertilisation

- The front of the head of the sperm cell contains an acrosome✓/vesicle which carries enzymes to dissolve a path into the ovum✓

- Nucleus of the sperm✓ carries genetic material of the male✓/ haploid number of chromosomes

- The middle piece contains mitochondria✓ which release energy✓ so that sperms could swim

- The presence of a long tail✓ enables sperm cells to swim✓ towards the ovum

- The contents of the sperm cell such as the cytoplasm is reduced✓/condensed making the sperm light for efficient movement✓ (Any 3 x 2) (6)

Fertilisation

- In the Fallopian tubes✓
- one sperm cell makes contact with the ovum's membrane✓
- The nucleus of the sperm enters the ovum✓
- Then the ovum membrane becomes impenetrable✓to other sperms
- The nucleus of the sperm fuses✓
- with the nucleus of the ovum✓ } OR sperm fuses with an ovum✓
- to form a diploid✓ zygote
- This is called fertilisation✓ (Any 5) (5)

Events after fertilisation until implantation

- The zygote divides by mitosis✓many times
- to form an embryo✓
- It first consists of a ball of cells✓
- called the morula✓
- which then develops into a hollow ball of cells✓
- called the blastula✓/blastocyst
- It embeds itself into the uterus lining✓/endometrium
- using chorionic villi✓ (Any 6) (6)

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
Only information regarding: - The structural suitability of the sperm cell - Events during fertilisation - Events after fertilisation until implantation No irrelevant information.	All structures are related to the respective functions of the sperm cell. The sequence of events in fertilisation and post fertilisation until implantation is in the correct order.	At least the following points should be included: - The structural suitability of the sperm cell **(4/6)** - Events during fertilisation **(3/5)** - Events after fertilisation until implantation **(4/6)**
1 mark	1 mark	1 mark

TOTAL SECTION C: 20
GRAND TOTAL: 150