



# basic education

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

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**LIFE SCIENCES P1**

**NOVEMBER 2017**

**MARKING GUIDELINES**

**MARKS: 150**

**These marking guidelines consist 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.

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**SECTION A**

**QUESTION 1**

1.1	1.1.1	D✓✓		
	1.1.2	B✓✓		
	1.1.3	D✓✓		
	1.1.4	A✓✓		
	1.1.5	C✓✓		
	1.1.6	C✓✓		
	1.1.7	D✓✓		
	1.1.8	B✓✓		
	1.1.9	B✓✓		
	1.1.10	D✓✓	(10 x 2)	<b>(20)</b>
1.2	1.2.1	External✓ fertilisation		
	1.2.2	Chiasma✓/Chiasmata		
	1.2.3	Aldosterone✓		
	1.2.4	Homeostasis✓		
	1.2.5	Amniotic✓ egg		
	1.2.6	Luteinising hormone✓/LH		
	1.2.7	Astigmatism✓		
	1.2.8	Corpus callosum✓		
	1.2.9	Optic✓ nerve		
	1.2.10	Meninges✓		<b>(10)</b>
1.3	1.3.1	None✓✓		(2)
	1.3.2	B only✓✓		(2)
	1.3.3	A only✓✓		(2)
			(3 x 2)	<b>(6)</b>
1.4	1.4.1	Motor✓/multipolar/efferent neuron		(1)
	1.4.2	(a) Nucleus✓/nuclear membrane		(1)
		(b) Cytoplasm✓/cell body		(1)
		(c) Dendrite✓		(1)
	1.4.3	(a) C✓ - Axon✓		(2)
		(b) D✓ - Myelin sheath✓		(2)
	1.4.4	Multiple sclerosis✓		(1)
				<b>(9)</b>
1.5	1.5.1	Pancreas✓		(1)
	1.5.2	Insulin✓		(1)
	1.5.3	Glucagon✓		(1)
	1.5.4	Diabetes✓mellitus		(1)
	1.5.5	Negative feedback✓/homeostasis		(1)
				<b>(5)</b>

**TOTAL SECTION A: 50**

**SECTION B**

**QUESTION 2**

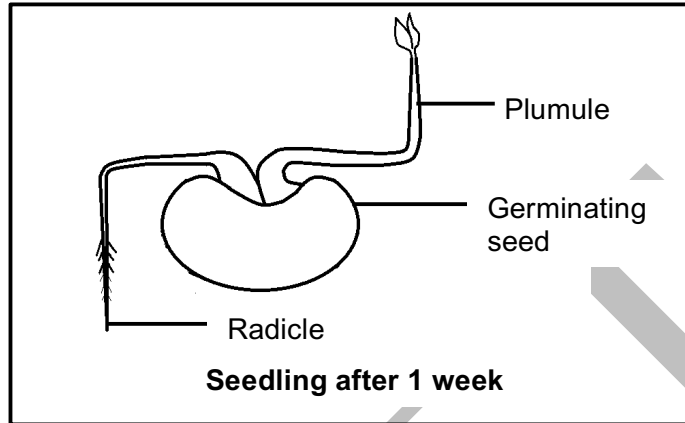
- 2.1 2.1.1 Northern Cape✓ (1)
- 2.1.2 Eastern Cape✓ (1)
- 2.1.3  $33,4/44,7 \times 100 = 75\%$  (Also accept 74,7) (3)
- 2.1.4 - Western Cape✓ and  
- Kwazulu-Natal✓ (2)  
**(MARK FIRST TWO ONLY)**
- 2.1.5 - Desalinate seawater✓  
to supplement the normal water supplies✓  
- Fix/maintain all waterworks✓/pipe systems  
to prevent water loss by leaking✓  
- Locate/access aquifers✓  
to provide additional water sources✓  
- Penalise people who are using too much water✓  
to prevent them from wasting water✓  
- Remove alien plants✓ in the catchment area of the dam  
to ensure that more water reaches the dams✓ (Any 2 x 2) (4)  
**(MARK FIRST TWO ONLY)**
- 2.1.6 - Habitats are destroyed✓  
which will lead to a loss in biodiversity✓  
- When flood gates are opened flooding may occur in the areas  
downstream from the dam✓  
resulting in erosion✓/loss of top soil/loss of lives/loss of  
biodiversity  
- The river downstream from the dam will receive less water✓  
which may have an negative impact on aquatic  
ecosystems✓/lead to biodiversity loss (Any 2 x 2) (4)  
**(MARK FIRST TWO ONLY)** (15)
- 2.2 2.2.1 - Food security refers to the access by all people✓  
- to adequate✓/safe/nutritious food (2)
- 2.2.2 - 'endemic to North and South America'✓  
- 'the armyworm reached Africa'✓ (Any 1) (1)  
**(MARK FIRST ONE ONLY)**
- 2.2.3 - The eggs may have arrived in maize imports✓  
- High altitude wind streams may have helped the moths to cross  
the Atlantic Ocean✓ (2)  
**(MARK FIRST TWO ONLY)**

2.2.4	Chemical✓ control		(1)
2.2.5	<ul style="list-style-type: none"> <li>- The armyworm may lead to crop failure✓ that will mean financial losses✓ for farmers</li> <li>- Crop failure will lead to food shortages✓ that will cause increase in food prices✓</li> <li>- Using pesticides could adversely influence other crops✓ that will cause increase in food prices✓</li> <li>- Using pesticides is expensive✓ and will lead to increased food prices✓</li> </ul>	(Any 1 x 2)	(2)
	<b>(MARK FIRST ONE ONLY)</b>		<b>(8)</b>
2.3	2.3.1	Telophase II✓	(1)
	2.3.2	<ul style="list-style-type: none"> <li>- There are four✓/4 cells</li> <li>- Each cell contains only a single set of un-replicated✓/single stranded chromosomes</li> </ul>	(2)
		<b>(MARK FIRST TWO ONLY)</b>	
	2.3.3	(a) Two✓/2	(1)
		(b) Four✓/4	(1)
	2.3.4	<ul style="list-style-type: none"> <li>(a) - Crossing over✓</li> <li>- Random arrangement of chromosomes✓ on the equator</li> </ul>	(2)
		<b>(MARK FIRST TWO ONLY)</b>	
		<ul style="list-style-type: none"> <li>(b) - The gametes that form will be genetically different✓</li> <li>- leading to variation in the offspring✓</li> <li>- This increases a species chances of survival✓</li> </ul>	(3)
			<b>(10)</b>
2.4	2.4.1	<ul style="list-style-type: none"> <li>(a) Chorion✓</li> <li>(b) Umbilical cord✓</li> </ul>	(1)
			(1)
	2.4.2	<ul style="list-style-type: none"> <li>- Protects the foetus from shock✓/Acts as a shock absorber</li> <li>- Protects the foetus from drying out✓</li> <li>- Protects the foetus from temperature changes✓</li> <li>- Allows free movement of the foetus✓</li> </ul>	(Any 2) (2)
		<b>(MARK FIRST TWO ONLY)</b>	
	2.4.3	<ul style="list-style-type: none"> <li>- Gaseous exchange system✓</li> <li>- Excretory system✓</li> <li>- Digestive system✓</li> </ul>	(Any 1) (1)
		<b>(MARK FIRST ONE ONLY)</b>	
	2.4.4	<ul style="list-style-type: none"> <li>- The foetus will receive less nutrients✓ and therefore have a lower birth mass✓/physical under- development/mental under-development</li> <li>- The foetus will receive less oxygen✓ and therefore have a lower birth mass✓/physical under- development/mental under-development</li> <li>- Waste will accumulate✓ and poison the foetus✓</li> </ul>	(Any 1 x 2) (2)
		<b>(MARK FIRST ONE ONLY)</b>	<b>(7)</b>
			<b>[40]</b>

**QUESTION 3**

- 3.1 3.1.1 - The growth of a plant✓/part of a plant (2)  
 - in response to a stimulus ✓

3.1.2



**Checklist for marking the diagram:**

Caption	(1)
Correct drawing:	
Radicle growing downwards	(1)
Plumule growing upwards	(1)
ONE correct label: Radicle/plumule/germinating seed	(1)
<b>Total:</b>	<b>(4)</b>

- 3.2 3.2.1 Tip of the stem✓/root (4)  
 (6)

- 3.2.2 - The auxin concentration will be high on the dark✓/shade side (4)  
 - because light destroys auxins✓/auxins move away from the (5)  
 light  
 - more growth occurs on the dark/shade side✓  
 - As a result the stem bends towards the light✓

- 3.3 3.3.1 - Group A✓ (2)  
 - Group C✓

3.3.2 (a) Amount of Thyroxin✓ (1)

(b) Metabolic rate✓ (2)  
 By measuring the **change in mass✓/consumption of oxygen**

3.3.3 Z, X, Y ✓✓ (In the correct sequence) (2)

- 3.3.4 Group B ✓ (1)
- 3.3.5 - The mass of the rats decreased ✓ / changed from 320 g to 309 g  
 - The oxygen consumption was the highest ✓ / (10ml/kg/min)  
 - indicating an increased rate of metabolism ✓  
 - which is caused by the higher thyroxin concentration ✓  
 - Diet Y contains the most thyroxin ✓ (5)
- 3.3.6 - The age of the rats must be the same ✓  
 - All the rats must receive the same amount of food ✓  
 - The rats must be of the same species/genetically similar ✓  
 - Use the same instrument to measure mass ✓  
 - The same person must take the measurements ✓ (Any 3) (3)
- (MARK FIRST THREE ONLY)** (16)
- 3.4 3.4.1 (a) Auditory nerve ✓ (1)
- (b) Round window ✓ (1)
- 3.4.2 Cerebrum ✓ (1)
- 3.4.3 - The cristae ✓ in the semi-circular canals  
 - are stimulated by changes in speed and direction ✓ of movement  
 - The cristae convert the stimuli to nerve impulses ✓  
 - The nerve impulses are transported along the auditory nerve ✓  
 - to the cerebellum ✓ to be interpreted (5)
- 3.4.4 - The mucus will block the opening of the Eustachian tube ✓  
 - Air cannot enter or leave the middle ear ✓  
 - to equalise pressure ✓ / causing imbalance in pressure
- OR**
- Mucus may move through the Eustachian tube to the middle ear ✓  
 - Build-up of mucus causes pressure in the middle ear ✓  
 - pushing on the tympanic membrane ✓ / part E (3)
- 3.4.5 - The ossicles/structures at A will not be able to vibrate ✓  
 - and hence no vibrations will be passed to the inner ear ✓ / cochlea will not be stimulated (2)
- (13)**  
**[40]**

**TOTAL SECTION B: 80**



## SECTION C

### QUESTION 4

#### **Spermatogenesis**✓

- Takes place under the influence of testosterone✓
- in the seminiferous tubules✓/testis
- Diploid cells✓/germinal epithelium
- undergo meiosis✓
- to form haploid sperm cells✓

(Any 4) (4)

#### **Formation and transport of semen**

- Sperm mature✓/are temporarily stored
- in the epididymis✓
- During ejaculation✓
- sperm move into the vas deferens✓
- As it passes the seminal vesicles✓,
- prostate gland✓ and
- Cowper's glands✓
- fluids are added that provide nutrition,✓
- promote the movement✓ of the sperm
- and neutralise the acids ✓ produced in the vagina
- The semen passes through the urethra✓
- into the vagina✓
- during copulation✓
- The sperm swims up the Fallopian tube✓ where it meets the ovum

(Any 7) (7)

#### **Structural suitability of the sperm cell for fertilisation**

- The acrosome✓
- contains 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✓

**(MARK FIRST THREE ONLY)**

(Any 3 x 2) (6)

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

## ASSESSING THE PRESENTATION OF THE ESSAY

<b>Relevance</b>	<b>Logical sequence</b>	<b>Comprehensive</b>
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 information relevant to <ul style="list-style-type: none"> <li>- Spermatogenesis</li> <li>- Formation and transport of semen</li> <li>- Structural suitability of sperm.</li> </ul> There is no irrelevant information	The sequence of events in <ul style="list-style-type: none"> <li>- Spermatogenesis</li> <li>- Formation and transport of semen and</li> <li>- Structural suitability of sperm are in a logical sequence</li> </ul>	The following must be included: <ul style="list-style-type: none"> <li>- Spermatogenesis (2/4)</li> <li>- Formation and transport semen (5/7)</li> <li>- Structural suitability of sperm (4/6)</li> </ul>
1 mark	1 mark	1 mark

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

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