



# basic education

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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 11 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	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✓		
	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✓ neuron		(1)
	1.4.2	(a) Nucleus✓/nuclear membrane		(1)
		(b) Cytoplasm✓		(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✓		(1)
				<b>(5)</b>
			<b>TOTAL SECTION A:</b>	<b>50</b>

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

- 2.1 2.1.1 Northern Cape✓ (1)
- 2.1.2 Eastern Cape✓ (1)
- 2.1.3 74,72 OR 74,7 OR 75✓✓✓% (3)
- OR (if candidate does not have above answer)
- $$\frac{33,4/(78,1-44,7)}{44,7} \times 100$$
 Max (2)
- 2.1.4 - Western Cape✓ and (2)  
- Kwazulu-Natal✓  
**(MARK FIRST TWO ONLY)**
- 2.1.5 - Research alternative methods✓/e.g.desalinate seawater/cloud seeding to supplement the normal water supplies✓  
- Fix/maintain all waterworks✓/pipe systems to prevent water loss by leaking✓  
- Locate aquifers✓/boreholes/underground water 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✓  
- Increase awareness✓ to encourage wise water use✓  
- Offer water tanks at a reduced price✓ to create additional source of water✓  
- Recycle grey water✓ to provide additional water sources✓  
- Build dams✓ to store water✓ (Any 2 x 2) (4)  
**(MARK FIRST TWO ONLY)**

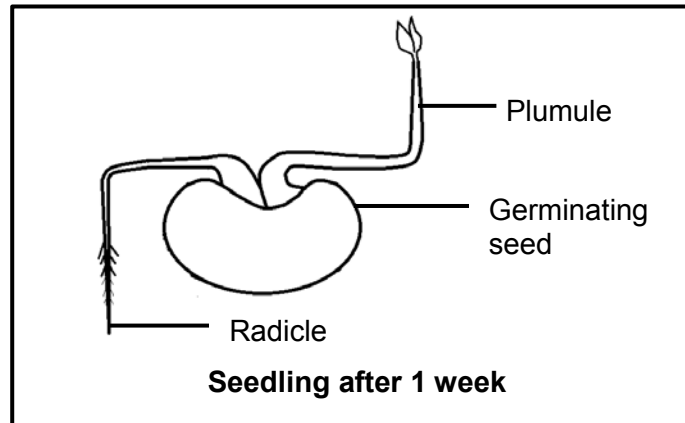
- 2.1.6
- Habitats are destroyed✓  
which will lead to a loss in biodiversity✓
  - When flood gates are opened flooding may occur in the areas  
downstream from the dam✓  
resulting in erosion✓/loss of top soil/loss of lives/loss of  
biodiversity
  - The river downstream from the dam will receive less water✓  
which may have a negative impact on aquatic  
ecosystems✓/lead to biodiversity loss
  - Wall blocks fish migration✓  
decreasing spawning✓/reproduction/survival
  - Dam wall restricts movement of organisms✓  
affecting food chains/webs✓
- (MARK FIRST TWO ONLY)** (Any 2 x 2) (4)  
**(15)**
- 2.2
- 2.2.1
- Food security refers to the access by all people✓
  - at all times✓
  - to adequate✓/safe/nutritious food
- (Any 2) (2)
- 2.2.2
- 'endemic to North and South America'✓
  - 'the armyworm reached Africa'✓
  - 'Invasion of *Spodoptera*'✓
- (MARK FIRST ONE ONLY)** (Any 1) (1)
- 2.2.3
- Maize imports✓
  - High altitude wind streams✓
- OR**
- Eggs✓
  - Moths✓
- (MARK FIRST TWO ONLY)** (2)
- 2.2.4
- Chemical✓control (1)
- 2.2.5
- The armyworm may lead to crop failure✓/food shortages  
that will mean financial/job losses✓for farmers
  - Food shortages✓/maize will have to be imported  
that will cause increase in food prices✓
  - Using pesticides could adversely influence other crops✓  
that will cause increase in food prices✓
  - Using pesticides is expensive✓and  
will lead to increased food prices✓
- (Any 1 x 2) (2)  
**(MARK FIRST ONE ONLY)** **(8)**

2.3	2.3.1	Telophase II✓		(1)
	2.3.2	- There are 4 cells✓ - Each cell contains only a single set of un-replicated✓/single stranded chromosomes		(2)
		<b>(MARK FIRST TWO ONLY)</b>		
	2.3.3	(a) Two/2✓		(1)
		(b) Four✓/4/2 pairs		(1)
	2.3.4	(a) - Crossing over✓ - Random arrangement✓ of chromosomes on the equator		(2)
		<b>(MARK FIRST TWO ONLY)</b>		
		(b) - The gametes that form will be genetically different✓ - leading to variation in the offspring✓/increasing the gene pool - This increases a species chances of survival✓		(3)
				<b>(10)</b>
2.4	2.4.1	(a) Chorion✓/Amnion		(1)
		(b) Umbilical cord✓		(1)
	2.4.2	- Protects the foetus from shock✓/Acts as a shock absorber - Protects the foetus from drying out✓ - Protects the foetus from temperature changes✓ - Allows free movement of the foetus✓	(Any 2)	(2)
		<b>(MARK FIRST TWO ONLY)</b>		
	2.4.3	- Gaseous exchange system✓ - Excretory system✓ - Digestive system✓	(Any 1)	(1)
		<b>(MARK FIRST ONE ONLY)</b>		
	2.4.4	- The foetus will receive less nutrients✓ and therefore have a lower birth mass✓/physical under-development/mental under-development		
		- The foetus will receive less oxygen✓ and therefore have a lower birth mass✓/physical under-development/mental under-development		
		- Waste will accumulate✓ and it will affect the functioning of the foetus✓	(A)	(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  
- in response to a stimulus✓ (2)

3.1.2



**Checklist for marking the diagram:**

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

- (4)  
**(6)**
- 3.2 3.2.1 Tip of the stem✓/tip of root/apical meristem/terminal bud/apical bud (1)
- 3.2.2 - The stem grows✓✓/bends  
- towards the light✓✓ (4)  
**(5)**
- 3.3 3.3.1 - Group A✓  
- Group C✓ (2)
- 3.3.2 (a) Amount of Thyroxin✓ (1)
- (b) Metabolic rate✓  
By measuring the **change in mass✓/consumption of oxygen** (2)
- 3.3.3 Z, X, Y ✓✓ (2)



- 3.3.4 Group B✓ (1)
- 3.3.5 - The mass of the rats decreased✓/changed from 320 g to 309 g  
 - since body fat is used✓/ less fat is stored  
 - The oxygen consumption was the highest✓/(10ml/kg/min)  
 - indicating an increased rate of metabolism✓/respiration  
 - which is caused by the higher thyroxin concentration✓  
 - Diet Y is the only diet that contained thyroxin✓/ group B receives thyroxin through diet Y (Any 5) (5)
- 3.3.6 - The age of the rats must be the same✓  
 - All the rats must receive the same amount of food✓  
 - Food must be given at the same time✓  
 - The rats must be of the same species✓/genetically similar  
 - Use the same instrument to measure mass✓  
 - The same person must take the measurements✓  
 - Use identical cages✓ (Any 3) (3)
- (MARK FIRST THREE ONLY) (16)**
- 3.4 3.4.1 (a) Auditory nerve✓ (1)
- (b) Round window✓/Fenestra rotunda (1)
- 3.4.2 Cerebrum✓ (1)
- 3.4.3 - The cristae✓in the semi-circular canals  
 - are stimulated by changes in speed and direction✓  
 - when the endolymph moves✓  
 - The cristae convert the stimuli to nerve impulses✓  
 - The nerve impulses are transported along the auditory nerve✓  
 - to the cerebellum✓to be interpreted  
 - Impulses sent to muscles✓ to restore balance (Any 5) (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✓  
 - causing 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/no amplification (2)
- (13)**  
**[40]**

**TOTAL SECTION B: 80**

**SECTION C****QUESTION 4****Spermatogenesis✓ (S)**

- 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 (T)**

- 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✓
- of the penis✓
- into the vagina✓
- during copulation✓
- and swims up the Fallopian tube✓ where it meets the ovum

(Any 7) (7)

**Structural suitability of the sperm cell for fertilisation (A)**

- 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
  
  - Many mitochondria✓ in the middle piece
  - release energy✓ so that sperms could swim
  
  - The presence of a 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✓
  
  - Sperm is streamlined✓
  - to allow for easier movement✓
- (MARK FIRST THREE ONLY)**

(Any 3 x 2) (6)

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

**ASSESSING THE PRESENTATION OF THE ESSAY**

<b>Relevance (R)</b>	<b>Logical sequence (L)</b>	<b>Comprehensive (C)</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 - Spermatogenesis - Formation and transport of semen - Structural suitability of sperm.  There is no irrelevant information	The information on - Spermatogenesis - Formation and transport of semen and - Structural suitability of sperm is in a logical sequence	The following must be included: - Spermatogenesis (2/4) - Formation and transport semen (5/7) - Structural suitability of sperm (4/6)
1 mark	1 mark	1 mark

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