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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 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)	**(20)**
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✓		**(10)**
1.3	1.3.1	None✓✓		(2)
	1.3.2	B only✓✓		(2)
	1.3.3	A only✓✓		(2)
			(3 x 2)	**(6)**
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)
				(9)
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)
				(5)
			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 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
- Kwazulu-Natal✓ (2)

(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✓ (Any 2 x 2) (4)

(MARK FIRST TWO ONLY) **(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*'✓ (Any 1) (1)

(MARK FIRST ONE ONLY)

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)
(MARK FIRST TWO ONLY)

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)
(MARK FIRST TWO ONLY)

(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)
(10)

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)
(MARK FIRST TWO ONLY)

2.4.3 - Gaseous exchange system✓
- Excretory system✓
- Digestive system✓ (Any 1) (1)
(MARK FIRST ONE ONLY)

2.4.4 - The foetus will receive less nutrients✓
and therefore have a lower birth mass✓/physical under-development/mental under-development

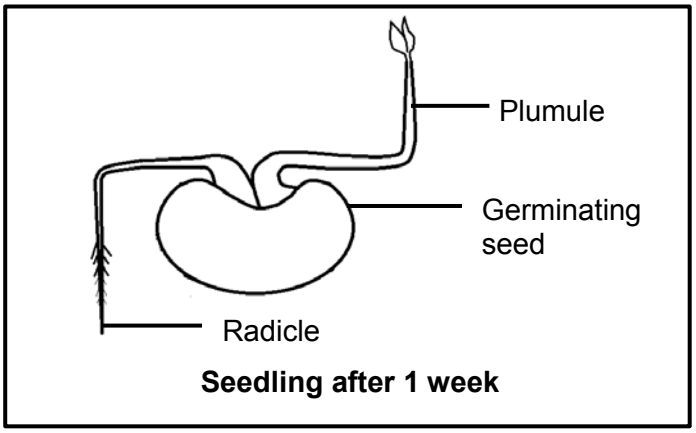
- The foetus will receive less oxygen✓
and therefore have a lower birth mass✓/physical under-development/mental under-development

- Waste will accumulate✓
and it will affect the functioning of the foetus✓ (A (2)
(MARK FIRST ONE ONLY) **(7)**
[40]

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 Plumule growing upwards	 (1) (1)
ONE correct label: Plumule/radicle/germinating seed	(1)
Total	**(4)**

(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

Relevance (R)	Logical sequence (L)	Comprehensive (C)
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