



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**SEPTEMBER 2020**



**LIFE SCIENCES P1  
MARKING GUIDELINE**

**MARKS: 150**

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This marking guideline consists of 12 pages.

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**PRINCIPLES RELATED TO MARKING LIFE SCIENCES**

1. **If more information than marks allocated is given**  
Stop marking when maximum marks are 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. Marking guidelines 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 learner's 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.



## SECTION A

## QUESTION 1

- |     |       |                               |         |      |
|-----|-------|-------------------------------|---------|------|
| 1.1 | 1.1.1 | C ✓✓                          |         |      |
|     | 1.1.2 | B ✓✓                          |         |      |
|     | 1.1.3 | B ✓✓                          |         |      |
|     | 1.1.4 | D ✓✓                          |         |      |
|     | 1.1.5 | B ✓✓                          |         |      |
|     | 1.1.6 | C ✓✓                          |         |      |
|     | 1.1.7 | B ✓✓                          |         |      |
|     | 1.1.8 | D ✓✓                          | (8 x 2) | (16) |
| 1.2 | 1.2.1 | Vasodilation ✓                |         |      |
|     | 1.2.2 | Hypothalamus ✓                |         |      |
|     | 1.2.3 | Negative feedback ✓           |         |      |
|     | 1.2.4 | Parasympathetic system ✓      |         |      |
|     | 1.2.5 | Aldosterone ✓                 |         |      |
|     | 1.2.6 | Synapse ✓                     |         |      |
|     | 1.2.7 | Placenta ✓                    | (7 x 1) | (7)  |
| 1.3 | 1.3.1 | None ✓✓                       |         |      |
|     | 1.3.2 | A only ✓✓                     |         |      |
|     | 1.3.3 | A only ✓✓                     | (3 x 2) | (6)  |
| 1.4 | 1.4.1 | (a) A ✓                       |         | (1)  |
|     |       | (b) E ✓                       |         | (1)  |
|     |       | (c) B ✓                       |         | (1)  |
|     |       | (d) F ✓                       |         | (1)  |
|     | 1.4.2 | Spinal cord ✓                 |         | (1)  |
|     | 1.4.3 | Reflex action ✓               |         | (1)  |
|     | 1.4.4 | Brain ✓ and the spinal cord ✓ |         | (2)  |
|     | 1.4.5 | (a) C ✓                       |         | (1)  |
|     |       | (b) D ✓                       |         | (1)  |



- |     |       |     |  |     |
|-----|-------|-----|--|-----|
| 1.5 | 1.5.1 | (a) | A – Vagina ✓   | (1) |
|     |       | (b) | B – Cervix ✓   | (1) |
|     |       | (c) | F – Uterus ✓   | (1) |
|     | 1.5.2 | (a) | C ✓ endometrium ✓  | (2) |
|     |       | (b) | D ✓ Ovary ✓  | (2) |
|     |       | (c) | E ✓ Fallopian tube ✓   | (2) |
|     | 1.5.3 |     | Sperm will not be able to fertilise the ovum ✓/ sperm will not be able to reach ovum and cause fertilisation | (1) |
|     | 1.5.4 |     | Both ovaries release ova ✓ alternately   | (1) |

**TOTAL SECTION A: 50**



## SECTION B

## QUESTION 2

- 2.1 2.1.1 (a) Prophase I ✓ (1)
- (b) Metaphase I ✓ (1)
- 2.1.2 (a) A – Centromere ✓ (1)
- (b) B – Homologous chromosomes ✓ / Chromosomes (1)
- (c) D – Centriole ✓ (1)
- 2.1.3 - Homologous chromosomes lie side by side ✓  
 - Chromatids from the paternal and maternal chromosomes ✓  
 - Establish contact points called chiasmata ✓ and  
 - Exchange genetic material between chromatids ✓ and  
 - This is known as crossing over ✓ (Any 4) (4)
- 2.1.4 - Homologous chromosomes randomly arrange themselves ✓  
 - on either side of the equator ✓ and this  
 - leads to the formation of new combinations of genetically  
 - different ✓ chromosomes  
 - in the daughter cells (gametes) causing variation\* ✓ in the next  
 generation (1\* compulsory point + any 2) (3)
- 2.2 2.2.1 Altricial ✓ development (1)
- 2.2.2 - Eyes closed ✓  
 - no down feathers covering the body ✓ / bodies naked  
 - unable to feed themselves ✓  
**(Mark first THREE only)** (3)
- 2.2.3 - Complete dependence on parents ✓ until fully developed  
**OR**  
 - unable to defend/move ✓  
 - therefore, they are an easy target for predation ✓ (Any  
 1) (1)
- 2.2.4 - The egg yolk that supplies nutrients to the developing embryo is  
 small ✓ therefore,  
 - the hatchlings are unable to develop fully ✓ before hatching (2)

- 2.3 2.3.1 Long/far-sightedness ✓ (Hypermetropia) (1)
- 2.3.2 - Eye ball is too rounded ✓  
- due to the inability of the lens of the eye to become more convex ✓  
- therefore, the image of the near object that falls on the retina is blurred ✓ while  
- the most clearly focussed image falls behind the retina ✓ (4)
- 2.3.3 It can be corrected with a convex lens ✓  
**(Mark first ONE only)** (1)
- 2.3.4 - The radial muscles of the iris contract ✓  
- the circular muscles relax ✓  
- the pupil dilates ✓  
- the amount of light entering the eye is increased ✓ (4)
- 2.4 2.4.1 Luteinizing hormone ✓ (LH) (1)
- 2.4.2 The highest level of LH causes ovulation ✓ (1)
- 2.4.3 13<sup>th</sup> ✓ day of the cycle (1)
- 2.4.4 - High level of oestrogen ✓ / an increase in level of oestrogen causes the endometrium to become more  
- vascular and spongy/thicker ✓ (2)
- 2.4.5 Progesterone ✓ (1)
- 2.4.6 - The maintenance of high levels of progesterone / hormone **B** after 28 days indicates pregnancy ✓  
- hormone B / progesterone is required to maintain pregnancy ✓ / maintain the endometrium (2)
- 2.4.7 - High levels of progesterone inhibit the secretion of FSH in order to stop the development of new follicles ✓ and  
- cause ovulation ✓ / no new ova produced  
- during pregnancy ✓ / disrupts pregnancy (3)

**[40]**

**QUESTION 3**

- 3.1 3.1.1 Thyroid gland ✓ (1)
- 3.1.2 Treatment of thyroxin ✓ / substance tadpoles were treated with (1)
- 3.1.3 - Quantity of NaOH and thyroxin treatment ✓  
 - Time of treatment/ feeding ✓  
 - Time of collecting data ✓  
 - Size of tadpoles ✓  
 - Type of nutrients ✓  
 - Quantity of nutrients ✓  
 - Level of activity / area of captivity ✓  
 - Environmental conditions ✓  
 - Method of determining the body mass ✓  
**(Mark first TWO only)** (Any 2) (2)
- 3.1.4 The initial body mass ✓ taken before the treatment (1)
- 3.1.5 - High levels of thyroxin ✓ in the body  
 - increase the rate of metabolism ✓  
 - More glucose will be oxidised ✓/ more of their fuel reserves are used up  
 - to release more energy ✓/ allowing them to be more active  
 - this leads to drop in the body mass (4)
- 3.1.6 - When the thyroxin level drops below normal limits  
 - pituitary gland / hypophysis is stimulated ✓  
 - Pituitary gland secretes more TSH ✓  
 - High TSH level stimulates the thyroid gland ✓  
 - The thyroid gland secretes more thyroxin ✓  
 - The thyroxin level thus increases ✓  
 - Thyroxin level returns to normal (5)



- 3.2 3.2.1 (a) B – Medulla oblongata ✓ (1)
- (b) C – Corpus callosum ✓ (1)
- (c) E – Cerebellum ✓ (1)
- 3.2.2 (a) - It conducts impulses between the brain and the receptors / effectors ✓  
- Serves as a reflex centre for actions ✓ such as blinking, sneezing, coughing etc. (Any 1) (1)  
**(Mark first ONE only)**
- (b) - Cerebro-spinal fluid in the central canal supplies nutrients and oxygen for nerve cells ✓/ removes CO<sub>2</sub> and waste products from the nerve cells / protects the brain and spinal cord against physical injury  
**(Mark first ONE only)** (1)
- 3.2.3 (a) - During a haemorrhage, the blood leaks out of the blood capillaries ✓  
- and this disrupts the supply of oxygen and nutrients to the nerve cells ✓/ removal of CO<sub>2</sub> and metabolic waste causing them to die ✓ / causes excessive pressure (3)
- (b) - Loss of sensation ✓/ consciousness / unable to process impulses from sense organs  
- loss of higher intellectual abilities ✓ such as memory, judgement, reasoning. etc.  
- unable to initiate voluntary muscular actions ✓ (3)
- 3.3 3.3.1 Auxin ✓ (1)
- 3.3.2 Auxin is present / produced at the growing tip ✓ of stem or root (1)
- 3.3.3 To cancel the effect of unilateral light on plumule growth ✓ / to show that the light has no effect on the upward bending of plumule / to exclude a phototropic response (1)

3.3.4 When a plumule is placed horizontally:

- Auxins are attracted by gravity ✓
- There is a high concentration of auxins on the lower side of the plumule ✓
- which stimulates growth / cell elongation / cell division on the lower side ✓
- There is a low concentration of auxins on the upper side of the plumule ✓
- which inhibits growth ✓/ cell elongation / cell division on the upper sides
- The lower side of the plumule grows faster ✓/ uneven growth occurs causing the plumule to grow/ bend upwards ✓
- The plumule grows away from gravity\* ✓/ the plumule is negatively geotropic

**1\* Compulsory mark + (Any 3) (4)**

3.3.5 The germinating seed is attached to the disc of rotating clinostat ✓ (1)

3.4 3.4.1 - Has a protective function ✓  
 - Acts as a climate control system for the testes ✓ / temperature control  
**(Mark first TWO only) (2)**

3.4.2 Epididymis ✓ (1)

3.4.3 - Fertility is reduced ✓  
 - because the temperature is always high ✓  
 - This will lead to production of abnormal sperms ✓/ fewer sperm are formed / proteins in the cells that form the sperm will denature

**OR**

- Fertility is reduced ✓  
 - because the pressure is increased ✓/ reducing circulation of the blood  
 - This will lead to the production of abnormal sperm ✓/ Fewer sperms are formed (3)

3.4.4 Take regular breaks ✓ while driving long distances (1)

**[40]**

**TOTAL SECTION B: 80**

**SECTION C****QUESTION 4**

**The process that led to an increased breathing rate:**

- The adrenal gland ✓
- secretes more adrenalin into the blood ✓
- An increased level of carbon dioxide ✓ in the surrounding area due to the heavy smoke
- causes carbon dioxide levels in the blood to increase above the normal levels ✓
- Receptor cells in the carotid artery in the neck are stimulated ✓
- to send impulses to the medulla oblongata in the brain ✓
- Medulla oblongata stimulates breathing muscles (intercostal muscles and diaphragm) ✓
- and heart ✓
- Breathing muscles contract more actively ✓
- Increases the rate and depth of breathing ✓
- The heart beats faster ✓
- More carbon dioxide is taken to and exhaled from the lungs ✓
- causing the breathing rate to increase

Max. 10 (10)

**Restoring balance**

Balance is achieved in the following way:

- The maculae ✓
- in the utricle and saccule ✓ and
- the cristae ✓
- in the semi-circular canals are stimulated ✓
- They generate impulses ✓
- which are transmitted through the auditory nerve ✓
- to the cerebellum ✓
- where they are interpreted ✓
- Impulses are transmitted via the motor neuron ✓
- to skeletal muscles ✓
- to restore balance

Max. 7 (7)

**Content (17)**

**Synthesis (3)**

**(20)**

**ASSESSING THE PRESENTATION OF THE ESSAY**

<b>Relevance</b>	<b>Logical sequence</b>	<b>Comprehension</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 is relevant to the:  - Process that led to an increased breathing rate - Restoring balance  There is no irrelevant information	The sequence of events and facts in the:  - Process that led to an increased breathing rate - Restoring balance  Are in a logical sequence	The following must be included:  - Process that led to an increased breathing rate <b>(B)</b> – (7/10)  - Restoring balance <b>(R)</b> – (4/7)
<b>1 mark</b>	<b>1 mark</b>	<b>1 mark</b>

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