Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2020

LIFE SCIENCES P1 MARKING GUIDELINE

MARKS: **150**

This marking guideline consists of 12 pages.

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^{th} ✓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)

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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_2 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_2 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 utriculus and sacculus ✓ 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

Relevance	Logical sequence	Comprehension
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) –** (7/10) - Restoring balance **(R) –** (4/7)
1 mark	**1 mark**	**1 mark**

TOTAL SECTION C: 20
GRAND TOTAL: 150