Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2015

LIFE SCIENCES P1 MEMORANDUM

MARKS: **150**

This memorandum consists of 9 pages.

SECTION A

QUESTION 1

1.1	1.1.1	A ✓✓		
	1.1.2	C ✓✓		
	1.1.3	B ✓✓		
	1.1.4	C ✓✓		
	1.1.5	B ✓✓		
	1.1.6	C ✓✓		
	1.1.7	A ✓✓		
	1.1.8	D ✓✓		
	1.1.9	C ✓✓		
	1.10	C ✓✓	(10 x 2)	(20)
1.2	1.2.1	Prostate gland ✓		
	1.2.2	Vagina ✓		
	1.2.3	Alzheimer's disease ✓		
	1.2.4	Scrotum ✓		
	1.2.5	Acrosome ✓		
	1.2.6	Eutrophication ✓ ***/*** Algal bloom	(6 x 1)	(6)
1.3	1.3.1	B only ✓✓		
	1.3.2	A only ✓✓		
	1.3.3	None ✓✓		
	1.3.4	A only ✓✓		
	1.3.5	Both A and B ✓✓		
	1.3.6	B only ✓✓		
	1.3.7	A only ✓✓	(7 x 2)	(14)

1.4	1.4.1	non-disjunction ✓ of chromosomes	(1)
	1.4.2	Anaphase 1 ✓	(1)
	1.4.3	12 ✓	(1)
	1.4.4	5 ✓	(1)
	1.4.5	6 ✓	(1)
1.5	1.5.1	A = Liver; ✓ B = Pancreas ✓	(2)
	1.5.2	(i) insulin ✓	(1)
		(ii) Glucagon ✓	(1)
	1.5.3	B ✓	(1)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 2.1.1 Hormone A – Luteinizing hormone ✓/ LH
Hormone B – Oestrogen ✓ (2)

2.1.2 Day 12 ✓ (1)

2.1.3 A sudden rise in the level of Luteinizing hormone ✓/ LH-levels causes the bursting of matured Graafian follicle ✓ to release the ovum/egg. (2)

2.1.4 Hormone A ✓ (1)

2.1.5 - No thickening of endometrium ✓ will occur therefore
- no menstruation will occur. ✓

OR

- No LH secreted ✓ therefore
- no ovulation will take place. ✓ (Any 1 x 2) (2)

2.1.6 - Breasts develops ✓
- Hips develops ✓
- Pubic hair develops ✓

(Mark FIRST ONE only) (Any 1 x 1) (1)

2.2 2.2.1 The curvature of the lens decreases; ✓ remain the same as the pencil moves further away from the eye. ✓

OR

Curvature of the lens increases ✓ as the pencil moves further away from the eye. ✓ (2)

2.2.2
- Amount of light. ✓
- Use the same pencil. ✓
- Use the same eye. ✓
- Time taken to focus on the pencil. ✓ (Any 2 x 1) (2)

2.2.3 By repeating the investigation. ✓ (1)

2.2.4
- Accommodation of the eye. ✓
- The ciliary muscle relaxes. ✓
- The ciliary body moves away from the lens. ✓
- Tension on the suspensory ligaments increased. ✓
- The lens becomes less convex/flattened. ✓
- The refractive power of the lens decreases. ✓
- A clear image is formed on the fovea of the retina. ✓ (Any 5 x 1) (5)

2.2.5 (a) Long-sightedness ✓ / Hypermetopia (1)

(b) By wearing glasses with convex lenses. ✓ (1)

2.2.6 Pupil ✓ (1)

2.3 2.3.1 A – Cristae ✓
B – Maculae ✓ (2)

2.3.2
- Sudden changes in speed and direction ✓ cause
- the endolymph within the semi-circular canals to move ✓
- and the movements of endolymph stimulates ✓
- the receptors called cristae
- within the ampullae situated at the base of each semi-circular canals. ✓
- When the direction of the head changes ✓
- gravitational pull ✓ stimulates different receptors
- called maculae within the sacculus and utriculus.
- Within the cristae and maculae the stimuli are converted to nerve impulses. ✓
- The impulses are transmitted by auditory nerve ✓
- to the cerebellum. ✓
- The cerebellum sends impulses to the muscles to restore ✓ balance. (Any 5 x 1) (5)

2.4 2.4.1 $\frac{20}{380}$ ✓ $\times 100$ ✓ $= 5{,}26\%$ ✓ (3)

2.4.2 420 ✓ parts per million ✓ (2)

2.4.3
- Burning of fossil fuels ✓
- Volcanic eruptions ✓
- Decomposition of organic matter ✓
- Respiration ✓
- Deforestation ✓

(Mark FIRST TWO only) (Any 2 x 1) (2)

2.4.4 - High concentration of CO_2 in the atmosphere traps more heat ✓
- and hence causing enhanced greenhouse effect, ✓
- that eventually causes a rise in the atmospheric temperature, ✓
- leading to enhanced global warming. ✓ (4)

[40]

QUESTION 3

3.1 3.1.1 59 million tons × 10% = 5,9 million tons ✓
59 million – 5,9 ✓= 53,1 million tons ✓ (3)

3.1.2 1% + 13% + 4% + 6% + 8% ✓ = 34% ✓ (2)

3.1.3
- Generate organic manure for farming. ✓
- Generate cheaper cooking gas ✓ (methane) for domestic purposes.

(Mark FIRST ONE only) (Any 1) (1)

3.1.4
- Disease carrying animals use these sites as their homes ✓ because of a ready supply of food. (1)
- Dump sites release unpleasant smell ✓ causing air pollution.
- Decomposition of pollutants may release toxic substances ✓ in to air and water causing health problems.

(Mark FIRST TWO only) (Any 2 x 1) (2)

3.2 3.2.1 To determine the effect of gravity on the direction of root growth. ✓ (1)

3.2.2 Growth movement of a part of a plant ✓in response to an external stimulus. ✓ (2)

3.2.3 The glass jar was covered with aluminum foil ✓
to exclude the influence of light in the direction of growth. ✓ (2)

3.2.4 Auxins ✓ (1)

3.2.5
- When a root is placed horisontally the auxins accumulate on the lower side, ✓ probably because of gravity. ✓
- A high concentration of auxins in roots inhibits growth. ✓
- Thus uneven distribution of auxins causes uneven growth of the root with the upper side growing faster. ✓
- The root therefore, bends downwards towards the gravitational force. ✓ (5)

3.3 3.3.1 A ✓ (1)

3.3.2
- Dilated superficial blood vessels. ✓
- Secretion of sweat from sweat glands. ✓ (2)

3.3.3 Hypothalamus ✓ (1)

3.3.4
- The consumption of a hot drink raises the body temperature; ✓
- which activates the sweat glands; ✓
- to secrete more sweat. ✓
- The evaporation of the excess amount sweat ✓
- cools down the body. ✓ (Any 4 x 1) (4)

3.4 3.4.1 Spinal cord ✓ (1)

3.4.2 (a)
- The functioning of the organs is controlled by the cerebrum ✓
- via the cranial nerves ✓ which originate directly from the brain. ✓ (3)

(b) Pituitary gland secrets hormone ✓ directly to the blood. ✓ (2)

3.5 3.5.1
- Foetus will not receive the nutrients from mother ✓ therefore the foetus will not grow. ✓
- Excretory products from the foetus will remain in the amniotic fluid, ✓ creating a toxic environment for the foetus. ✓
- The foetus will not receive oxygen from mother ✓ resulting in death by suffocation/no cellular respiration for gowth.
- Carbon dioxide from the foetus will remain in the amniotic fluid ✓ leading to toxic environment for growth of foetus ✓ (Any 2 x 2) (4)

3.5.2 - High level of the hormone progesterone ✓
- inhibits the secretion of the FSH ✓
- therefore no follicle will develop. ✓ (3)

[40]

TOTAL SECTION B: 80

SECTION C

QUESTION 4

Reflex action: A reflex action is a rapid, ✓ automatic response ✓ to a stimulus. (2)

Mechanism of reflex action

- The sudden and unexpected body contact of spider stimulates ✓
- the receptors ✓and
- generates nerve impulses. ✓
- These impulses are then transmitted along the dendrites
- cell body and axon of sensory neurons. ✓
- Many sensory neurons combined together to form a sensory nerve ✓
- and therefore, the impulses are transmitted along the sensory nerve
- towards the spinal nerve, ✓ to the
- spinal ganglion ✓ in the dorsal branch of the spinal nerve.
- Instead of transmitting the impulses to the brain, ✓
- impulses are transferred directly to the connector neuron ✓ and
- to dendrite, cell body and axon of the motor neuron. ✓
- Since many motor neurons form part of the spinal nerve
- impulses are transmitted through the ventral branch ✓ spinal nerve
- towards the effector ✓ (muscle) where it causes
- a quick response ✓ such as diving out of chair with a loud scream
- to counter the potentially dangerous condition. ✓
- A quick reaction to a dangerous stimulus is called reflex action. ✓
- Impulses to the brain is delayed ✓ fractionally
- to save valuable time to protect ✓ the body from the potential danger.

(Any 7) (7)

Role of Adrenalin to enhance fight or flight response

- Increases the rate and depth of breathing ✓ so that more oxygen is obtained quickly. ✓
- Causes the liver to convert more glycogen to glucose ✓ so that more energy can be produced by high rate of cellular respiration. ✓
- Increases the rate of heartbeat and blood pressure ✓ so that blood with more glucose can be carried quickly to the skeletal muscles and brain. ✓
- Causes the blood vessels of the muscles, heart and brain to dilate ✓ so that more blood with glucose and oxygen can be taken to these parts. ✓
- Causes the blood vessels of the digestive system and skin to constrict ✓ so that less blood is sent to these parts and more blood becomes available for the heart, brain and skeletal muscles. ✓
- Increases the metabolic rate of the cells in the brain and skeletal muscles ✓ so that more energy is released for muscular activity and clear thought. ✓
- Increases the tone of the skeletal muscles ✓ so that they can function more effectively. ✓ (Any 4 x 2) (8)

[17]

ASSESSING THE PRESENTATION OF THE ESSAY

Criterion	Relevance (R)	Logical sequence (L)	Comprehensive (C)
Generally	All information provided is relevant to the topic.	Facts are arranged in a logical/sequential order.	All aspects required by the essay have been sufficiently addressed.
In this essay	Only information relevant to the definition, mechanisms of reflex action and the role of hormone adrenalin to enhance 'fight and flight' response are discussed (There is no irrelevant information.)	The mechanism of reflex action is described in the correct sequence and the effect of adrenalin is appropriately linked to the relevant significance in a logical manner	The definition, mechanism of reflex action thoroughly discussed with at least 4 effects of adrenalin is described together with the significance of each sufficiently
MARK	**1**	**1**	**1**

Content (17)
Synthesis (3)

TOTAL SECTION C: 20
GRAND TOTAL: 150