KWAZULU-NATAL PROVINCE

EDUCATION

REPUBLIC OF SOUTH AFRICA

LIFE SCIENCES P1

PREPARATORY EXAMINATION

MARKING GUIDELINE - SEPTEMBER 2022

NATIONAL
SENIOR CERTIFICATE

GRADE 12

MARKS: 150

This marking guideline consists of 8 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.

SECTION A

QUESTION 1

1.1	1.1.1	C✓✓		
	1.1.2	D✓✓		
	1.1.3	B✓✓		
	1.1.4	D✓✓		
	1.1.5	C✓✓		
	1.1.6	B/ D ✓✓		
	1.1.7	D✓✓		
	1.1.8	B✓✓		
	1.1.9	A✓✓		
	1.1.10	C✓✓	(10 x 2)	**(20)**
1.2	1.2.1	Meninges✓		
	1.2.2	Dendrites✓		
	1.2.3	Eustachian tube✓		
	1.2.4	Multiple Sclerosis✓		
	1.2.5	Geotropism✓		
	1.2.6	Apical dominance✓		
	1.2.7	Astigmatism✓		
	1.2.8	Sclera✓		
	1.2.9	Precocial✓		
	1.2.10	External fertilisation✓	(10×1)	**(10)**
1.3	1.3.1	B only✓✓		(2)
	1.3.2	A only✓✓		(2)
	1.3.3	A only ✓✓		(2)
				(6)
1.4	1.4.1	(a) A✓ – Cerebrum✓		(2)
		(b) D✓ – Medulla oblongata✓		(2)
		(c) B✓ – Cerebellum✓		(2)
		(d) C✓ – Spinal cord✓		(2)
				(8)
1.5	1.5.1	(a) Pituitary gland✓/hypophysis		(1)
		(b) Thyroid✓ gland		(1)
	1.5.2	(a) TSH✓/Thyroid stimulating hormone		(1)
		(b) Thyroxin✓		(1)
	1.5.3	U✓		(1)
	1.5.4	T✓		(1)
				(6)
				50

SECTION B

QUESTION 2

2.1 2.1.1 (a) Cochlea✓ (1)

(b) Auditory canal✓ (1)

2.1.2 C✓ (1)

2.1.3
- Impulses would not be sent to the brain✓/cerebrum/cerebellum
- therefore, no hearing would occur✓/balance will not be maintained. (2)

2.1.4
- Eustachian tube gets blocked✓
- By the fluid build up✓
- therefore, pressure builds up in the middle ear✓
- causing ossicles to stop vibrating / tymphanic membrane will not vibrate✓
- leading to impaired hearing✓ Any 3 (3)

(8)

2.2
- A change in direction and speed✓ of the head
- stimulates the cristae✓ in the ampullae
- which converts the stimulus into an impulse✓
- which is then sent to the cerebellum✓
- via the auditory nerve✓
- The cerebellum sends impulses to the skeletal muscles✓
- to restore balance✓ Any 6 **(6)**

2.3 2.3.1 Liver✓ (1)

2.3.2
- A hormone is secreted✓
- directly into the blood✓ (2)

2.3.3 Insulin✓ (1)

2.3.4
- Gland A/The pancreas/islets of Langerhans secrete glucagon✓
- which causes the liver✓/organ B
- to convert glycogen to glucose✓
- causing glucose levels in the blood to increase✓ Any3 (3)

(7)

2.4 2.4.1 M✓ (1)

2.4.2
- Blood vessels are constricted✓/vasoconstriction occurred
- Less blood flows to the skin surface✓
- Heat is retained / less or no heat is lost✓ (3)

2.4.3
- Sweat gland becomes more active✓
- More sweat is produced✓ (3)
- and transported to the surface of the skin✓ **(7)**

2.5 2.5.1 Accommodation✓ (1)

2.5.2
- Ciliary muscles contract✓
- Suspensory ligaments slacken✓
- Lens becomes more biconvex✓/rounder/fatter
- Refractive power increases✓
- Light is refracted more✓
- Clear image is formed on the retina✓ Any 5 (5)

2.5.3 - Cornea ✓/ aqueous humor / vitreous humor (1)
(MARK first ONE only)

2.5.4
- The lens is not able to bend as much✓/is less elastic
- The lens does not become biconvex enough✓
- The light is not bent enough to form a clear image on the retina✓

OR

- The refractive power of the lens is low✓/the lens cannot become more convex and
- Light rays are not refracted✓/bend enough for a clear image
- To be focused on the retina✓. (3)

2.5.5 Cataracts✓ (1)
(11)

2.6 2.6.1 Sticky plaque✓ (1)

2.6.2
- Memory loss✓
- Mood changes✓
- Difficulty in speech✓

(Mark the FIRST TWO only) Any 2 (2)

2.6.3
- Blood tests could give early detection✓ of the disease
- And patients can start medication early✓
- Preventing development of symptoms✓
- Therefore, people can live full lives✓/AD free lives Any 3 (3)

(6)

2.7
- Receptors receive the stimulus✓ and
- convert stimulus into an impulse✓
- Impulse travels via sensory neuron✓
- To the interneuron of the spinal cord✓/CNS
- Which sends impulses via motor neuron✓
- To the effectors✓
- Which bring about a quick response to the stimulus✓ Any 5 **(5)**

[50]

QUESTION 3

3.1 3.1.1 (a) Auxin concentration✓ (1)

(b) Plumule growth✓ (1)

3.1.2 For measurement of the plumule length✓ (1)

3.1.3 - They used seven seedlings in each group✓/35 seeds in total/a large sample
- They calculated the average✓ increase in plumule length
(MARK FIRST ONE ONLY) Any 1 (1)

3.1.4 - Same species of beans✓
- Seedlings of the same age✓
- Seedlings of the same size✓
- Same temperature✓
- The same investigator✓
- Identical apparatus (beakers/petri-dishes/graph paper/grid) ✓
- same volume of the solution✓ Any 3 (3)
(MARK FIRST THREE ONLY)

3.1.5 An increase in auxin concentration up to an optimum/10 ppm stimulates the growth rate of the plumule/stem. With further increase in auxin concentration there is an inhibition of plumule/stem growth ✓✓✓ (3)

3.1.6 Gibberellins✓
Abscisic acid✓ Any 1 (1)
(Mark FIRST ONE ONLY) **(11)**

3.2 3.2.1 Adrenal gland✓ (1)

3.2.2 185 mg/ml/min✓ Accept (183 ≤ values≤ 187) (1)

3.2.3 - Aldosterone is responsible for lowering salt content✓
- as the levels of aldosterone increases ✓
- the tubular reabsorption of salt will increase ✓ (3)

3.2.4 (150 – 75) ÷ 75 ✓ for the value at 5 au **accept (148 ≤ values≤ 152)**
= 75/75 × 100✓ for the value at 2 au **accept (73 ≤ values≤ 77)**
= 100%✓ (3)
(8)

3.3 3.3.1 (a) Chorionic villi✓ (1)

(b) Chorion✓ (1)

3.3.2 - It acts as a micro-filter✓/prevents harmful substances from reaching the foetus
- Produces antibodies✓
- It secretes progesterone✓/oestrogen during pregnancy/maintains the endometrium
- Immunity is transferred from the mother to the foetus✓ Any 2 (2)

(MARK FIRST TWO ONLY)

✓

3.3.3

BLOOD VESSEL A	BLOOD VESSEL B
High concentration of nutrients✓/example of nutrient	Low concentration of nutrients✓/example of nutrient
Low concentration of waste products✓/example of waste product	High concentration of waste products✓/example of waste product
High concentration of oxygen✓	Low concentration of oxygen✓
Low concentration of carbon dioxide✓	High concentration of carbon dioxide✓

(MARK FIRST TWO ONLY) TABLE 1 + (2×2) (5)

3.3.4 - Waste products/nitrogenous waste/CO_2 will accumulate✓ in the foetus' body
- causing the death✓/harm of the foetus. Any 1×2 (2)

(MARK FIRST ONE ONLY)

3.3.5 - Harmful substances✓/bacteria
- may pass from the mother's blood to the blood of the foetus✓

OR

- The blood types✓/other proteins of the mother and baby
- may not be compatible✓ (2)

(13)

3.4 - zygote is formed✓
- which divides by mitosis✓
- to form a mass ball of cells✓
- called morula✓
- which grows into a hollow ball of cells✓
- called blastula✓/blastocyst. Any 4 **(4)**

3.5 3.5.1 (a) vas deferens✓/sperm duct (1)

(b) Urethra✓ (1)

(c) Prostate gland✓ (1)

3.5.2 - Spermatogenesis✓*
- Under the influence of testosterone✓
- diploid cells✓/germinal epithelium
- in the seminiferous tubules ✓ of the testis
- undergo meiosis✓
- to form (haploid) sperm✓ *1 compulsory + Any 3 (4)

3.5.3 - Tight underwear will pull the testes close to the body✓
- The temperature of the testes will be too high✓/higher pressure on the testes
- and sperm will not mature✓/sperm production is negatively affected. Any (3)

3.5.4 (a) - There will be no sperm in the semen✓
- therefore, no fertilisation can take place✓ (2)

(b) - The fluid part of the semen will still be produced✓
- by the accessory glands✓/seminal vesicles/prostate gland/ Cowper's glands (2)
(14)
[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150