GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PREPARATORY EXAMINATION

2021

MARKING GUIDELINES

LIFE SCIENCES (PAPER 1) (10831)

12 pages

PRINCIPLES RELATING TO THE MARKING OF LIFE SCIENCES

1. **If more information than marks allocated is given**
   Stop marking when maximum marks are reached and place 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 the whole process is given when only part of it is required**
   Read all and credit relevant parts.

4. **If comparisons are asked for, but descriptions are given**
   Accept if 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 the 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 memo discussion meeting.

14. **If only letter is asked for, but only 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 ways.**

17. **Caption.**
All illustrations (diagrams, drawings, 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 the learners' 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 marking guidelines**
No changes may be made to the marking guidelines without consulting the provincial internal moderator.

SECTION A

QUESTION 1

1.1 1.1.1 A✓✓

1.1.2 D✓✓

1.1.3 D✓✓

1.1.4 A✓✓

1.1.5 D✓✓

1.1.6 B✓✓

1.1.7 B✓✓

1.1.8 C✓✓

(8 x 2) **(16)**

1.2 1.2.1 Cataract✓

1.2.2 Autonomic✓ (nervous system)/Sympathetic

1.2.3 Apical dominance✓

1.2.4 Altricial✓

1.2.5 Yolk✓**/**Albumen

(5 x 1) **(5)**

1.3 1.3.1 A Only✓✓

1.3.2 B Only✓✓

1.3.3 Both A and B✓✓

(3 x 2) **(6)**

1.4	1.4.1	(a)	E✓	(1)
		(b)	D✓	(1)
		(c)	H✓	(1)
		(d)	G✓	(1)
		(e)	F✓	(1)
		(f)	A✓	(1)
				(6)
1.5	1.5.1		Gibberellins✓	(1)
	1.5.2		Geotropism✓	(1)
	1.5.3	(a)	B✓ and E✓/E and B	(2)
		(b)	B✓ and D✓/D and B	(2)
		(c)	A ✓ and C ✓/C and A	(2)
	1.5.4		Chemical✓ Mechanical✓/thorns	(2)
				(10)
1.6	1.6.1	(a)	A – Pituitary✓/Hypophysis B – Adrenal✓gland	(2)
		(b)	C – Aldosterone✓ D – ADH✓***/***Anti-diuretic hormone	(2)
	1.6.2		Salt✓***/***Sodium	(1)
	1.6.3		Adrenalin✓	(1)
	1.6.4		Homeostasis✓	(1)
				(7)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 2.1.1 6 mm✓ (1)

2.1.2 $\frac{4,9 \text{ mm} + 3,8✓ \text{ mm}}{2✓}$ **OR** $\frac{8,7 ✓}{2✓}$

= 4,35✓ mm (3)

2.1.3 As the luminance increases, the diameter of the pupil decreases. ✓✓ (2)

2.1.4
- In the iris,✓
- the circular muscles contract,✓
- the radial muscles relax,✓
- diameter of the pupil decreases✓/pupil constricts,
- less light enters the eye. ✓ (Any 3) (3)

2.1.5 (a) How bright the light is✓ (1)

(b) A fast✓, involuntary/automatic response✓ to a stimulus. (2)

2.1.6
- Cone cells/rod cells/photoreceptors will be damaged, ✓
- no stimulus will be picked up, ✓
- no impulse will be created. ✓
- No impulse is sent along the optic nerve,✓
- and no interpretation takes place in the cerebrum. ✓
- Vision will be impaired ✓*

(Any 2 + 1* Compulsory) (3)

(15)

2.2 2.2.1 A – Ciliary muscles✓
B – Suspensory ligaments✓ (2)

2.2.2

Sensory Neuron	Motor Neuron
Carries an impulse towards the central nervous system ✓/ afferent neuron.	Carries an impulse away from the central nervous system ✓/efferent neuron.
Has only one dendrite/ unipolar.✓	Has many dendrites/multipolar.✓
Both the dendrite and axon are myelinated. ✓	Only the axon is myelinated. ✓
Makes up only part of white matter. ✓	Makes up part of white and grey matter. ✓
Found in dorsal root.✓	Found in ventral root.✓
Shorter axon✓	Longer axon✓

(Mark first TWO only) (2 x 2 + 1 Table) (5)

2.2.3 Peripheral✓ (1)

2.2.4
- Structure A/ciliary muscle is relaxed, ✓
- Structure B**/**suspensory ligaments are tight/taut.✓
- The tension on the lens is increased. ✓
- The lens is less convex/flatter. ✓
- The refractive power of the lens will be decreased✓/light rays are refracted less. (Any 4) (4)

(12)

2.3 2.3.1 (a)
- Joins the two hemispheres✓ of the cerebrum
- Allows for communication between the two hemispheres✓ of the cerebrum.

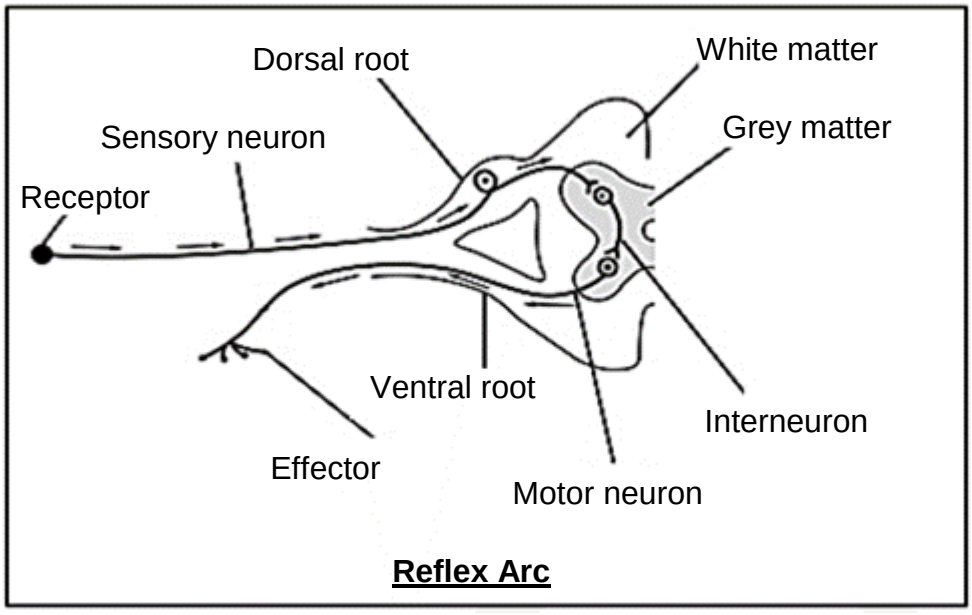
(Mark first ONE only) (Any 1) (1)

(b)
- Controls voluntary actions.✓
- Receives and interprets sensations from sense organs✓
- Higher thought processes✓

(Mark first ONE only) (Any 1) (1)

(c) Transmits impulses between the peripheral nerves and brain.✓/ Allows for reflex actions to take place. (1)

2.3.2



Reflex Arc

Criteria for assessing diagram:

Neurons positioned correctly in diagram	**(P)**	1
Correct direction of the impulses indicated	**(D)**	1
Any TWO correct labels	**(L)**	2
Caption	**(C)**	1

NOTE: Diagram may be drawn on the right or left side of the spinal cord. (5)

(8)

2.4 2.4.1 (a) D✓ – Eustachian tube✓ (2)

(b) C✓ – Cochlea✓ (2)

(c) E✓ – Tympanic membrane✓**/**Eardrum (2)

(d) A✓ – Malleus✓**/**Hammer (2)

(e) F✓ – Auditory canal✓/Ear canal (2)

2.4.2
- The cristae,✓ in the semi-circular canal
- are stimulated by changes in speed and direction, ✓
- as the head moves when the goalkeeper dives. ✓
- This causes the endolymph in the semi-circular canals to move. ✓
- The cristae convert the stimuli to nerve impulses. ✓
- The nerve impulses are transported along the auditory nerve, ✓
- to the cerebellum ✓to be interpreted. (Any 5) (5)

(15)

[50]

QUESTION 3

3.1 3.1.1
- The hypothalamus is stimulated,✓
- and sends impulses to the blood vessels of the skin.✓
- Blood vessels dilate ✓**/**blood vessels become wider**/**vasodilation occurs.
- More blood flows to the surface of the skin.✓
- More heat is lost,✓
- through radiation ✓from the skin.
- More blood is sent to the sweat glands. ✓
- Sweat glands become more active. ✓**/**More sweat is released.
- Evaporation of the sweat cools (the skin). ✓ (Any 6) (6)

3.1.2 (a)
- (Blood water content) will decrease✓
- due to increased sweating.✓ (2)

(b)
- (Blood CO_2 levels) will increase✓
- due to increased respiration✓ in the muscle cells. (2)

3.1.3
- When carbo-loading before the race,
- excess carbohydrates**/**glucose is stored,✓
- as glycogen✓**/**fats.
- While running there is increased cellular respiration,✓
- this decreases the blood glucose level✓**/**uses up glucose.
- The stored glycogen in the liver✓**/**muscles,
- is converted to glucose,✓
- when glucagon is secreted,✓
- by the islets of Langerhans✓**/**pancreas. (Any 6) (6)

(16)

3.2 3.2.1 CO_2 levels✓ (1)

3.2.2 The same:
- Age✓
- Sex ✓
- Level of fitness✓/health
- Weight✓
- Levels of activity✓
- Diet✓

(Mark first TWO only) (2)

3.2.3
- Get permission from school/parents/volunteers.✓

Decide:
- which variables need to be controlled✓
- what method will be used✓
- what equipment will be needed✓
- how the result will be recorded✓
- what safety measures will be needed✓
- a date/time when the investigation would be carried out✓

(Mark first TWO only) (2)

3.2.4 When CO_2 levels in the blood increase above normal:
- It decreases the pH of the blood✓
- which stimulates receptors✓
- to send an impulse to the Medulla Oblongata.✓
- The Medulla oblongata stimulates the breathing muscles (intercostal muscles and diaphragm) ✓
- to contract faster✓
- and the breathing rate increases ✓
- so that excess carbon dioxide is exhaled faster. ✓ (Any 4) (4)

(9)

3.3 3.3.1
- Many women have a poor understanding of the menstrual cycle✓
- or the process of ovulation.✓
- Incorrect timing of intercourse✓

(Mark first TWO only) (2)

3.3.2 Oestrogen✓ (1)

3.3.3 Ovary✓/Ovarian follicle/Graafian follicle (1)

3.3.4 Pituitary✓**/**Hypophysis (1)

3.3.5 Fertilization will be more likely. ✓

OR

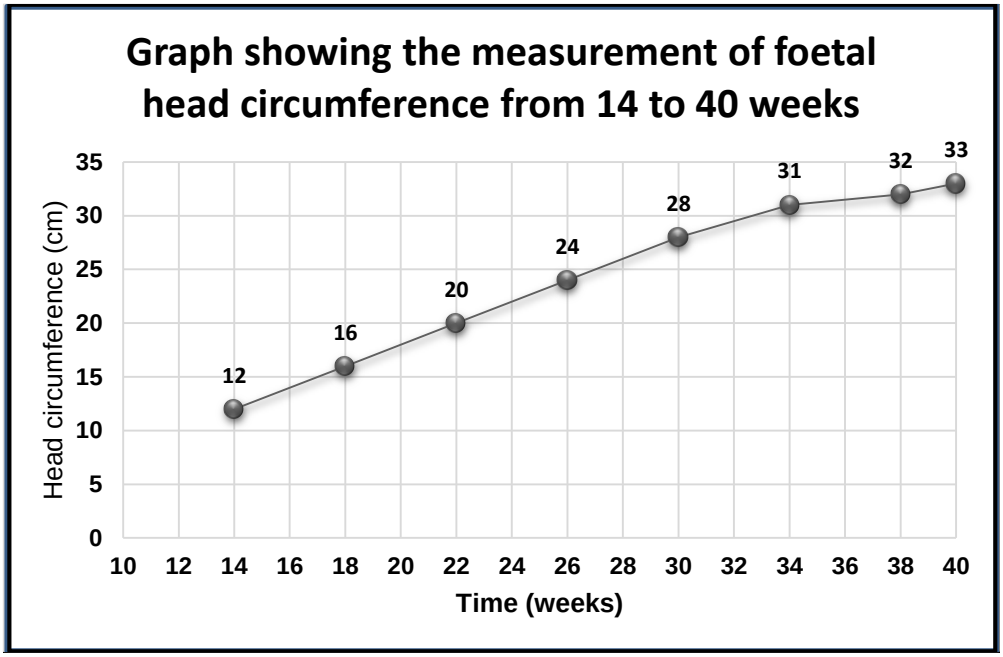
Sperm will already be present in fallopian tubes when the ovum is released.✓ (1)

3.3.6
- The endometrium will not be thick enough✓/maintained
- therefore, no implantation will take place✓. (2)

(8)

3.4 3.4.1 Gestation✓ (1)

3.4.2



Criteria for assessment of the graph

Correct type of graph	**(T)**	1
Caption for graph (includes both variables)	**(C)**	1
Correct label for X-axis (including unit) and Y-axis (including unit)	**(L)**	1
Correct scale for X-axis and Y-axis	**(S)**	1
Plotting of points: 1 to 7 points correct All 8 points correct	**(P)**	 1 2

(6)

3.4.3
- Protects the foetus against shock/mechanical injuries✓
- Keeps the foetus moist✓/Protects the foetus from drying out
- Protects the foetus from temperature changes✓
- Allows the foetus to move freely✓/Supports the body of the foetus during development

(Mark first THREE only) (Any 3) (3)

3.4.4
- Cervix✓
- Vagina✓
- Vulva

(Mark first TWO only) (Any 2) (2)

3.4.5
- Nutrients✓/Oxygen
- will flow to the foetus✓
- via the umbilical vein. ✓
- Metabolic waste✓/urea/ toxic substances
- will not flow away from the foetus✓
- via the umbilical arteries ✓
- therefore, the foetus will be negatively affected✓ die**/**miscarry.

(Any 5) (5)

(17)

[50]

TOTAL SECTION B: 100

TOTAL: 150