GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

Commented [EM1]:

PREPARATORY EXAMINATION

2019

MARKING GUIDELINES

LIFE SCIENCES (PAPER 2) (10832)

11 pages

GAUTENG DEPARTMENT OF EDUCATION

PREPARATORY EXAMINATION

LIFE SCIENCES
(Paper 2)

MARKING GUIDELINES

PRINCIPLES RELATING TO THE MARKING OF LIFE SCIENCES

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

4. **If comparisons are asked for and 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-recognized 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 recognizable accept, 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 and 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 way.**

17. **Caption.**
All illustrations (diagrams, graphs, tables, etc.) must have captions.

18. **Code-switching of official languages (terms and concepts)**
A single word or two that appears in any official language other than the learners' 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.

19. **Changes to the memorandum**
No changes may be made to the ratified memorandum without consultation with the Provincial Internal Moderator.

SECTION A

QUESTION 1

1.1	1.1.1	B✓✓		
	1.1.2	B✓✓		
	1.1.3	C✓✓		
	1.1.4	C✓✓		
	1.1.5	A✓✓		
	1.1.6	B✓✓		
	1.1.7	D✓✓		
	1.1.8	D✓✓		
	1.1.9	C✓✓		
			(9 x 2)	**(18)**
1.2	1.2.1	Multiple allelic✓ / multiple alleles		
	1.2.2	Gene✓		
	1.2.3	Co-dominance✓		
	1.2.4	Stem cells✓		
	1.2.5	Cloning✓		
	1.2.6	Mitochondrion✓		
	1.2.7	Heterozygous✓		
	1.2.8	Genome✓		
			(8 x 1)	**(8)**
1.3	1.3.1	B only✓✓		
	1.3.2	None✓✓		
	1.3.3	Both A and B✓✓		
			(3 x 2)	**(6)**
1.4	1.4.1	DNA replication ✓		(1)
	1.4.2	Nucleotide✓		(1)
	1.4.3	1 – guanine✓ 2 – cytosine✓		(2)
	1.4.4	Double helix✓		(1)
	1.4.5	Hydrogen bond✓		(1) **(6)**

1.5	1.5.1	**A** cell membrane✓ / plasmalemma **B** homologous chromosomes✓ / bivalent **D** spindle fibres✓		(3)
	1.5.2	The chromosomes are of the: - Same size✓ - Same shape✓ - Same length✓ **(Mark first TWO only)**	Any 2	(2)
	1.5.3	**I** metaphase 1✓ **II** prophase 1✓ **III** metaphase 2✓		(3)
	1.5.4	- Single row of chromosomes✓ - at the equator✓		(2)
	1.5.5	- Crossing over✓ - Random arrangement of chromosomes✓		(2) **(12)**
			TOTAL SECTION A:	**50**

SECTION B

QUESTION 2

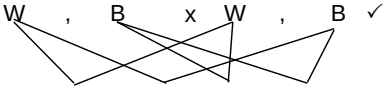
2.1	2.1.1	CCT✓	(1)
	2.1.2	- Amino acid isoleucine will be coded for✓ - instead of phenylalanine✓ - A different protein may form✓ / nonsense protein formed / protein's function may be affected	(3)
	2.1.3	- In replication DNA is formed✓ and in transcription mRNA is formed✓ - In replication 2 strands of DNA act as a template✓ and in transcription 1 strand of DNA is used as a template✓ - In replication thymine is complementary to adenine✓ and in transcription uracil is complementary to adenine✓ **(Mark first TWO only)** Any 2 x 2	(4) **(8)**
2.2	2.2.1	Peptide ✓bond	(1)
	2.2.2	tRNA ✓	(1)
	2.2.3	GCA✓	(1)
	2.2.4	Ribosome✓	(1) **(4)**
2.3	2.3.1	Tom and Harry✓	(1)
	2.3.2	They both have blood type O ✓	(1)
	2.3.3	Type A ✓ and Type B✓	(2) **(4)**

2.4 2.4.1 Incomplete dominance✓ (1)

2.4.2 P_2 Phenotype Grey coat rat x Grey coat rat✓
Genotype WB x WB ✓

Meiosis

G/gametes W , B x W , B ✓



Fertilisation

F_2 Genotype WW : WB : WB : BB✓*

Phenotype 1 White coat : 2 Grey coats: 1 Black coat✓*

P_2 and F_2✓
Meiosis and fertilisation ✓

2 compulsory + Any 4

OR

P_2 Phenotype Grey coat rat x Grey coat rat✓
Genotype WB x WB

Meiosis

Fertilisation

Gametes	W	B
W	WW	WB
B	WB	BB

1 mark for correct gametes✓
*1 mark for correct genotypes✓**

F_2 Phenotype 1 White coat: 2 Grey coats: 1 Black coat✓*

P_2 and F_2✓
Meiosis and fertilisation✓

2 compulsory + Any 4 (6)
(7)

2.5 2.5.1 Purple flowers, long pollen grains ✓ (1)

2.5.2 ab ✓✓ (2)

2.5.3 Purple flowers, long pollen grains ✓: purple flowers, round pollen grains ✓ (2)
(5)

2.6 2.6.1 (a) Time✓ / Source of milk (1)

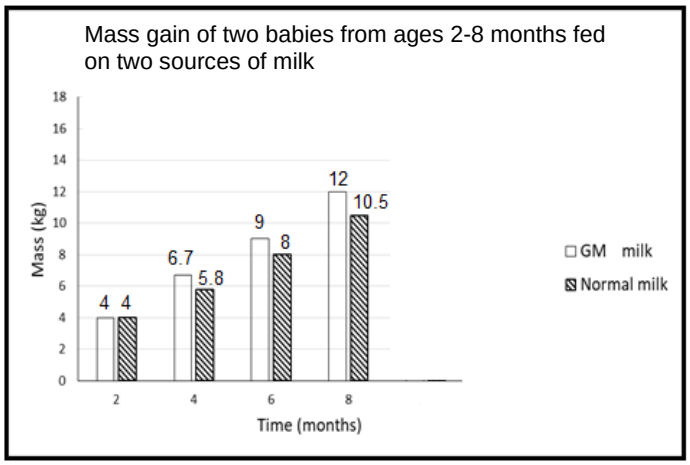
(b) Mass✓/ Weight (1)

2.6.2
- Same age ✓
- Same mass to start off with ✓
- Same time intervals of measurement ✓
- Same unit of measurement of mass✓

(Mark first ONE only) Any 1 (1)

2.6.3 $\frac{15,8 - 4}{4}$ ✓ x 100 ✓= 295% ✓ (3)

2.6.4



Rubric for assessment of the graph

Criterion	**Mark Allocation**
Correct type of graph (**T**)	1
Caption for graph (**C**)	1
Correct labels including units for X-axis and Y-axis (**L**)	1
Correct scales for y-axis and size of bars and spaces between bars (**S**)	1
Plotting of points:	
1 to 7 bars correct (**P**)	1 **OR**
Graph drawn for **required years** only, with all 8 bars correct	2

(6)
(12)
[40]

QUESTION 3

3.1 3.1.1
- Due to use or disuse✓ /more or less use of an organ
- it becomes more or less developed✓
- and this acquired characteristic✓
- is passed on to the offspring✓ (4)

3.1.2
- Punctuated equilibrium explains the speed at which evolution occurs✓
- it involves long periods of time✓
- where species do not change ✓/change gradually through natural selection
- known as equilibrium✓
- alternating with short periods of time✓
- where rapid changes✓ occur through natural selection

Any 4 (4)

3.1.3

Natural selection	Artificial selection
The environment or nature is the selective force✓	Humans represent a selective force✓
Selection is in response to suitability to the environment✓	Selection is in response to satisfying human needs✓
Occurs within species✓	May involve one or more species✓

(Mark first TWO only) ✓table (5)
(13)

3.2 3.2.1 *Anolis scriptus*✓ (1)

3.2.2
- Short hind limbs✓
- Bigger toepads✓
- Longer arms✓

(Mark first TWO only) Any 2 (2)

3.2.3
- Longer hind legs acted as sails✓catching the wind✓ / carrying the lizard away into the sea (2)

(5)

3.3
- There was variation in the spike shape of the cell wall✓ of the bacteria population.
- Bacteria with triangle spikes and square spikes✓
- were not antibiotic resistant✓/ antibiotics were able to bind to the surface
- and were killed by the antibiotics ✓/ did not survive
- The bacteria with the round spikes✓
- were resistant to the antibiotics✓/ antibiotics were unable to bind to the surface and they survived
- and reproduced, passing the characteristic of round spikes to the next generation✓ increasing the proportion of these bacteria

Any 6 **(6)**

3.4 3.4.1 **X** – foramen magnum✓ (1)

Y – canines✓ (1)

3.4.2
- The more forward position of the foramen magnum✓/ X
- allows the spinal cord to exit the skull directly downwards✓
- This acts as an axis for the skull✓
- making it favourable for bipedalism✓/ an upright position

Any 3 (3)

3.4.3 a) **B**✓ (1)

(b) **A**✓ (1)

3.4.4
- There is an increase✓
- in the cranium size✓from organism **B** to organism **C**
- This will allow it to house a larger brain✓/ cerebrum which suggests greater intelligence

(3)

3.4.5 (a)
- The spine changed from C-shaped to more curved ✓/ s-shape,
- which provides better support for bipedalism✓ (2)

(b)
- The pelvis changed from being long and narrow to shorter and wider✓,
- to support the body weight in an upright position✓ (2)

3.4.6
- The oldest fossils of *Homo erectus* were found in Africa✓,
- while the younger fossils were found in other parts of the world✓
- suggesting that *Homo erectus* originated in Africa✓ Any 2 (2)

(16)

[40]

TOTAL SECTION B: 80

SECTION C
QUESTION 4

Speciation

- If a population of a single species becomes separated✓
- by a geographical barrier✓ (sea, river, mountain, lake)
- There is now no gene flow✓ between the populations / the populations can no longer interbreed.
- Since each population may be exposed to different environmental conditions✓,
- natural selection occurs independently in each of the two populations✓
- such that the individuals of the two populations become very different✓
- genotypically and phenotypically.✓
- Even if the populations were to mix again,✓
- they will not be able to reproduce✓ with each other.
- They have thus become different species.✓

Any (9)

Reproductive isolating mechanisms

- **Breeding at different times of the year**✓
- One species is fertile when the other is not✓
- **Species-specific courtship behaviour**✓
- Courtship behaviour of one species will not attract other species✓
- **Adaptation to different pollinators**✓
- Pollinator of one species is not adapted to pollinate another species✓
- **Infertile offspring**✓
- A new species cannot form because they cannot produce fertile offspring✓
- **Pheromones✓are used to attract mates**
- If the pheromones are not correct, they will not mate ✓
- **Different genitalia**✓
- Unsuited / incompatible reproductive organs prevent mating✓ Any 4 x 2 (8)

NOTE: NO marks will be awarded for answers in the form of flow charts, tables or diagrams.

ASSESSING THE PRESENTATION OF THE ESSAY

Criterion	Relevance (R)	Logical sequence (L)	Comprehensive (C)
Generally	All information provided is relevant to the topic.	Ideas are arranged in a logical / cause-effect sequence.	All aspects required by the essay have been sufficiently addressed.
In this essay in Q4	Only information relevant to: – Geographic speciation – Reproductive isolation mechanisms was included. There is no irrelevant information	The description of: – Geographic speciation is logical and sequential – Reproductive isolation mechanisms are in a logical sequence	Minimum correct points include: – **6/9** for Geographic speciation – **5/8** for Reproductive isolating mechanisms
Mark	1	1	1

TOTAL SECTION C: 20

TOTAL: 150