GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

JUNE EXAMINATION
GRADE 12

2025

MARKING GUIDELINES

LIFE SCIENCES

11 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 only the first three irrespective of whether all or some are correct/incorrect.

3. **If whole process is given when only part of it is required**
   Read all and credit relevant part.

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-recognised abbreviations**
   Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation but credit the rest of 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, 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 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 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 marking guidelines**
No changes must be made to the marking guidelines without consulting the provincial internal moderator.

Additional notes:

NB these are to assist markers, some content is as a concession and should not be indicated/taught to learners.

Wherever there are two ticks at the end of a response, it is two or nothing, learners cannot get one mark for an incomplete response.

If a learner gives two processes when one is asked for, mark the first process and ignore the second irrespective of which is correct.

Markers are reminded to read and apply ALL 19 marking principles which are at the start of the marking guidelines.

QUESTION 1
Q1.1
If a learner gave more than one answer, no marks will be awarded irrespective of whether the first is correct. E.g. 1.1.3 C /D X
Q1.2
If the learner gives any slashes, no marks will be awarded irrespective of whether the first is correct. E.g. 1.2.2 Rods /cones X
1.2.3 Genome not accepted. The genome is the **entire** set of DNA instructions found in a cell (all chromosomes). The genetic composition of an organism is the genotype.
1.2.6 No mark for Autonomic … as the question states **"in** emergency situations"
Q. 1.3

1.3.2 Accept just B✓✓ (without only)
1.3.3. Accept Both✓✓ (without A and B), A and B✓✓ (without both); A, B✓✓
No mark for A/B X

QUESTION 2
2.1.1. Second bullet accept **clearest** image✓
2.1.3 Bullet 1 and 2 MUST include the word iris in at least one of them
2.2.2. Both double helix AND DNA need to be there for the mark.
The last bullet MUST have RNA nucleotides (not just nucleotides)
2.2.4 accept: the wrong protein is formed✓.
No mark for: a new protein is formed X
No mark for: no protein is formed. X
2.3.4 Accept X^h X^H as a concession (heterozygous is still shown)
2.3.5 No mark for P2 and F2.
Phenotype: NO mark for Normal/affected/unaffected. NO mark if the sex/gender is not included with haemophilia/haemophiliac. NO mark if genotype reference is included in the phenotype e.g Heterozygous Non-haemophilic femaleXX
Phenotype: Accept references to gender e.g Haemophilic father x Non-haemophilic mother✓
Accept male with haemophilia etc. (in place of haemophiliac.)
2.4.1 (b) The word use MUST be there. NO mark if the learner wrote "**effect of** marijuana use" XX
2.5.1 Accept: maternity testing✓

QUESTION 3
3.1.2 Accept: The embryo/blastocyst/blastula sinks into the endometrium ✓ (for the second bullet).
3.1.3 Drawing (D)- Accept if the cell membrane is rounded but the jelly layer is uneven
Labels (L)- Accept zona pellucida/corona radiata
Only credit for the labels given in the marking guidelines.
3.2.3 NO marks for an answer given as a flow diagram
The synapse mark can be given at a number of places, but the other bullets sequence is important.
3.3.4 accept: Down Syndrome – has an extra chromosomes at pair 21 ✓/trisomy 21
For Normal human- the learner has to indicate 2 chromosomes at pair 21 ✓
3.5.1 A variety of verbs could be acceptable. e.g To show, to prove, to compare, to investigate etc.
The aim cannot be in the past tense and cannot be stated as a question.

SECTION A

QUESTION 1

1.1 1.1.1 D ✓✓

1.1.2 D ✓✓

1.1.3 C ✓✓

1.1.4 B ✓✓

1.1.5 A ✓✓

1.1.6 C ✓✓

1.1.7 A ✓✓

1.1.8 A ✓✓

1.1.9 B ✓✓

1.1.10 C ✓✓

(10 x 2) **(20)**

1.2 1.2.1 Organ of Corti ✓

1.2.2 Rods ✓

1.2.3 Genotype ✓

1.2.4 Co-dominance ✓

1.2.5 Double helix ✓

1.2.6 Sympathetic ✓nervous system

1.2.7 Corpus luteum ✓

1.2.8 Ovaries ✓/Ovary

(8 x 1) **(8)**

1.3 1.3.1 None ✓✓

1.3.2 B only ✓✓

1.3.3 Both A and B ✓✓

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

1.4 1.4.1 - Spinal Cord ✓ and Brain ✓
(Mark first TWO only) (2)

1.4.2 Meninges ✓ (1)

1.4.3 (a) Cerebrum✓ (1)
(b) Medulla oblongata✓ (1)
(c) Cerebellum ✓ (1)

1.4.4 (a) Autoimmune ✓ (1)
(b) Myelin sheath ✓ (1)
(8)

1.5 1.5.1 Cloning✓ (1)

1.5.2 (a) G✓ (1)
(b) A✓ (1)

1.5.3 Fertilisation✓ (1)
(4)

1.6 1.6.1 DNA replication ✓ (1)

1.6.2 - Nucleus ✓
- Mitochondrion ✓ /Mitochondria
- Chloroplast ✓
(Mark first THREE only) (3)
(4)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 2.1.1 - It has the highest concentration of cones (photoreceptors) ✓/only has cones
- to create clearest vision ✓ (2)

2.1.2 - A ✓ lens ✓ (2)

2.1.3 Pupillary mechanism ✓ * (compulsory mark)
- radial muscles of the iris relax ✓
- circular muscles of the iris contract ✓
- the pupil constricts ✓
- the amount of light entering the eye is reduced ✓

1 *compulsory mark + any 3 (4)

2.1.4 - D ✓ optic nerve ✓ (2)
(10)

2.2 2.2.1 TCA ✓ (1)

2.2.2 Transcription✓*
- The double helix DNA unwinds✓
- The double-stranded DNA unzips✓ /weak hydrogen bonds break
- to form two separate strands✓
- One strand is used as a template✓
- to form mRNA ✓
- using free RNA nucleotides from the nucleoplasm✓

1*complementary mark + any 4 (5)

2.2.3 - DNA has deoxyribose sugar ✓ and RNA has ribose sugar ✓
- DNA has thymine ✓ and RNA has uracil ✓

(Mark first TWO only) (4)

2.2.4 - The DNA base triplet changes from TCA to TAC ✓
- the tRNA anti-codon changes from UCA to UAC ✓
- Amino acid will change from Serine to Methionine ✓
- a different protein will be formed ✓ Any 3 (3)
(13)

2.3 2.3.1 Pedigree ✓ diagram (1)

2.3.2 - A gene is a segment of DNA (in a chromosome) that contains the code for a particular characteristic ✓/protein
- Alleles are alternative forms of a gene ✓ that occur at the same locus on homologous chromosomes (2)

2.3.3 (a) Two ✓ /2 (1)
(b) Two ✓ /2 (1)

2.3.4 **A –** $X^H X^h$ ✓
B – $X^h Y$ ✓ (2)

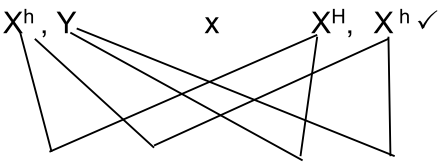
2.3.5 **P_1**

Phenotype: Haemophilic male x Non-haemophilic female ✓
Genotype: $X^h Y$ x $X^H X^h$ ✓

Meiosis

G/gametes X^h, Y x X^H, X^h ✓

Fertilisation



F_1 Genotype: $X^H X^h$; $X^h X^h$ ✓; ($X^H Y$; $X^h Y$)
Phenotype: Non-haemophilic female; haemophilic Female ✓; (non-haemophilic male; haemophilic male)
50% ✓* haemophilic female

P_1 and F_1 ✓
Meiosis and Fertilisation ✓ * **compulsory** + Any 5

OR

P_1

Phenotype: Haemophilic male x Non-haemophilic female ✓
Genotype: $X^h Y$ x $X^H X^h$ ✓

Meiosis

Fertilisation

Gametes	X^H	X^h
X^h	$X^H X^h$	$X^h X^h$
Y	($X^H Y$)	($X^h Y$)

1 mark for correct gametes
1 mark for correct genotypes

F_1 Phenotype: Non-haemophilic female; haemophilic Female ✓(; non-haemophilic male; haemophilic male)
50% ✓* haemophilic female

P_1 and F_1 ✓
Meiosis and Fertilisation ✓ * **compulsory** + Any 5 (6)
(13)

2.4 2.4.1 (a) Male fertility ✓ (1)
(b) Marijuana use ✓/Cannabis use (1)
(c) -Number of men per group ✓/ 200 participants per group (1)
- Ethnicity ✓
- Age group ✓
- Duration of investigation for both groups ✓
(Mark first ONE only)

2.4.2 - A sample of 200 men was used ✓
- The investigation was conducted for five years ✓
(Mark first TWO only) (2)

2.4.3 Acts as a control group ✓/increases validity
To compare fertility of those who smoke marijuana ✓
To confirm if male fertility is affected by the use of marijuana ✓ Any 2 (2)
(7)

2.5 2.5.1 Paternity testing ✓ (1)

2.5.2 Uncle 3 ✓ (1)

2.5.3 - Four/more bands of the boy match with the bands of Uncle 3's ✓ DNA profile
- Only two/fewer bands match with uncle 1's DNA profile ✓
- both are blood group B ✓ / Uncle 2's blood group does not match. (3)

2.5.4 Type B ✓ OR
Type AB ✓
(Mark first TWO only) (2)
(7)
[50]

QUESTION 3

3.1 3.1.1 (a) Morula ✓ – solid ball of cells ✓ (2)

(b) Blastula ✓/Blastocyst
hollow ball of cells✓/fluid filled ball of cells (2)

3.1.2 - Implantation ✓
- The embryo/blastocyst/blastula attaches (using the chorionic villi) to the endometrium ✓ (2)

3.1.3

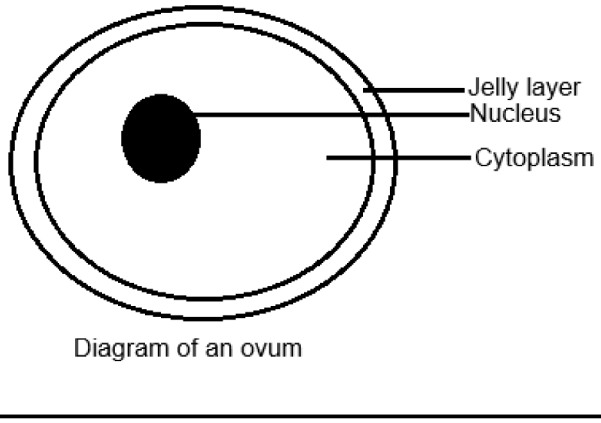


Diagram of an ovum

Criterion	Elaboration	Symbol	Mark
Caption	"Ovum" mentioned	C	1 Mark
Drawing	Rounded ovum cell drawn with a nucleus.	D	1 Mark
Labels	Any 1 correct Any 2 correct	L	1 mark 2 marks
			Total: 4 marks

(4)
(10)

3.2 3.2.1 A – Sensory ✓ neuron
C – Motor ✓ neuron (2)

3.2.2 A quick, automatic response to a stimulus ✓✓ (2)

3.2.3 - The nerve impulse is transmitted along the sensory neuron ✓
- through the dorsal root ✓
- to an interneuron ✓ in the spinal cord
- via a synapse, ✓
- Then to the motor neuron ✓ exiting
- via the ventral root ✓
- to the effector. ✓ Any 5 (5)

3.2.4 - Reflex arc✓ (1)
(10)

3.3 3.3.1 - It is to detect a genetic/chromosomal condition ✓ during pregnancy. (1)

3.3.2 - Chorion ✓ and Amnion ✓
(Mark First TWO only) (2)

3.3.3 - Protects the foetus against mechanical injury ✓/shock-absorber
- Prevents dehydration of the foetus ✓
- Maintains the temperature of the foetus ✓
- Allows for free-movement of the foetus ✓ as it grows and develops
(Mark First TWO only) Any 2 (2)

3.3.4 Down Syndrome – has 3 chromosomes at pair 21 ✓
Normal human – has 2 chromosomes at pair 21 ✓ (2)
(7)

3.4 3.4.1 - X – Spindle fibre ✓ /spindle thread
- Y – Centrosome ✓/centriole
- Z – Centromere ✓ (3)

3.4.2

Meiosis I	Meiosis II ✓
Crossing over takes place ✓	Crossing over does not take place ✓
In prophase/metaphase, Chromosomes arranged in homologous pairs ✓	In prophase/metaphase, chromosomes are arranged individually ✓
(Whole) chromosomes move to opposite poles of the cell ✓	Chromatids move to opposite poles of the cell ✓
Two cells are formed at the end of this division ✓	Four cells are formed at the end of this division ✓
The chromosome number is halved ✓	The chromosome number remains the same ✓
*** Table must have correct column headings or no mark will be awarded for tabulation.** **(Mark first TWO only)** Any 2 x 2 + 1 Table	

(5)

3.4.3 When chromosomes/chromatids fail to separate ✓ during anaphase✓ (2)

3.4.4 Anaphase I✓ (1)

3.4.5 - One cell will have three ✓ chromosomes.
- Another cell will have one ✓ chromosome.

OR

- One cell will have four ✓ chromosomes.
- Another cell will have none ✓ chromosome. (2)

OR

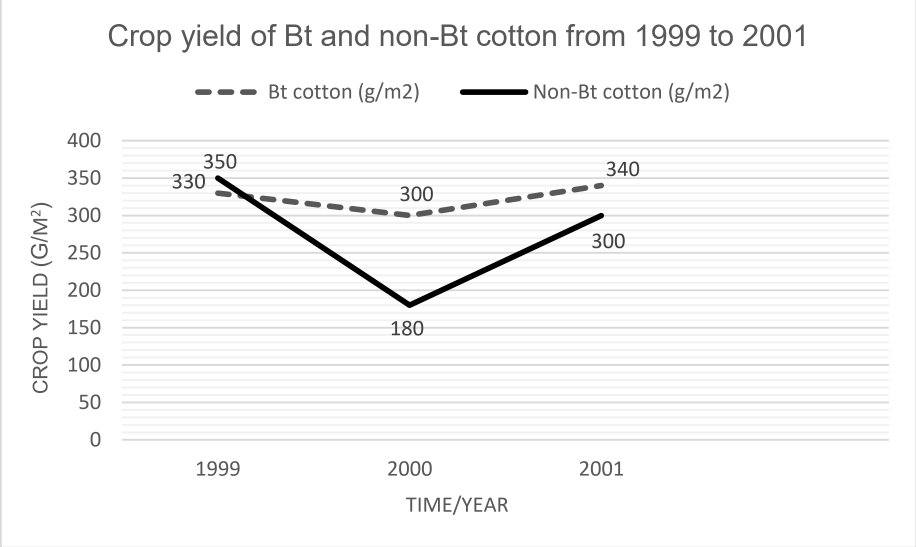
- One cell with an extra chromosome ✓
- One cell with one less chromosome ✓

(13)

3.5 3.5.1 To determine the crop yield of Bt and non-Bt cotton ✓✓ over time in a certain country.
(Must have To, a verb and both variables) (2)

3.5.2 - An increase in crop yield ✓, will increase profit ✓ since more cotton is sold.
- Less use of insecticides ✓ thus saving money from buying insecticide ✓
(MARK FIRST ONE)
(2)

3.5.3



Criteria for assessment of the graph

Criterion	Elaboration	Symbol	Marks
Type of graph	DOUBLE Line graph drawn	(T)	1
Caption	Includes Crop yield of Bt AND non-Bt cotton AND specific years (1999-2001)	(C)	1
Axes labels	Correct label for x-axis and y-axis (including unit g/m^2)	(L)	1
Scale	Consistent scale and spacing on x and y-axes	(S)	1
Plotting	1 to 5 points correctly plotted ONLY 6 points correctly plotted (1999-2001)	(P)	1 2
		TOTAL:	**6**

(6)

- If any points for 2004 to 2007 are plotted, allocate only 1 mark for plotting (P).
- If a bar graph/histogram is drawn, the candidate will lose the marks for type (T) AND scale (S).
- If the axes are swapped/transposed, the candidate will lose marks

for axes labels (L) and Plotting (P).

- If the years are not in the correct order, no marks will be awarded for scaling (S) but the plotting (P) can be awarded if it corresponds correctly.
- If the two lines are not labelled (BT cotton and Non-BT cotton) no marks will be awarded for plotting (P).

(10)
[50]

TOTAL SECTION B: 100

TOTAL: 150