AMENDED FINAL

KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL STANDARDISED ASSESSMENT

GRADE 12

LIFE SCIENCES

JUNE 2026

MARKING GUIDELINES

MARKS: 150

This memorandum consists of 10 pages.

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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.

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SECTION A
QUESTION 1

1.1	1.1.1	D✓✓		
	1.1.2	A✓✓		
	1.1.3	B✓✓		
	1.1.4	D✓✓		
	1.1.5	D✓✓		
	1.1.6	C✓✓		
	1.1.7	D✓✓		
	1.1.8	C✓✓		
	1.1.9	D✓✓		
	1.1.10	A✓✓	(10 x 2)	**(20)**
1.2	1.2.1	Gene✓		
	1.2.2	Follicle Stimulating Hormone✓/FSH		
	1.2.3	Allantois✓		
	1.2.4	Oogenesis✓		
	1.2.5	Endometrium✓		
	1.2.6	Corpus luteum✓		
	1.2.7	Homeostasis✓		
	1.2.8	Corpus callosum✓		
	1.2.9	Blastocyst✓/Blastula		
	2.1.10	Haploid✓	(10 x 2)	**(10)**
1.3	1.3.1	A only✓✓		(2)
	1.3.2	A only✓✓		(2)
	1.3.3	A only✓✓		(2)
				(6)
1.4	1.4.1	(a) Prostate gland✓		(1)
		(b) Vas deferens✓		(1)
		(c) Seminal vesicle✓		(1)
	1.4.2	D✓ - Testis✓		(2)
	1.4.3	C✓ - Urethra✓		(2)
				(7)
1.5	1.5.1	3✓		(1)
	1.5.2	(a) B✓		(1)
		(b) ii✓		(1)
		(c) - A - B - AB ✓✓		(2)
	1.5.3	(a) 50✓%		(1)

(b) 25✓% (1)
(7)

TOTAL SECTION A: [50]

SECTION B

QUESTION 2

2.1 2.1.1 (a) Ribosome✓ (1)

(b) mRNA✓ (1)

(c) Adenine✓/A (1)

2.1.2 Codon✓ (1)

2.1.3 (Strand) 2✓ (1)

2.1.4
- Makes up genes which carry hereditary information✓
- Contains coded information for protein synthesis✓ (2)

(Mark the FIRST TWO only)

2.1.5 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✓
- The mRNA is complementary to the DNA✓
- mRNA now has the coded message for protein synthesis✓

*1 compulsory + any 5 (6)
(13)

2.2 2.2.1 (a)
- Matching tissues✓ for organ transplant
- Identifying relatives✓
- Identifying dead bodies✓
- Used for solving criminal cases✓
- Diagnosing genetic disorders✓

Any (1)

(Mark the FIRST ONE only)

(b)
- It is expensive✓
- Human error could occur✓/mistakes during interpretation
- Inaccurate since only a small piece of DNA sample is used✓
- Evidence could be planted✓ to frame someone
- Deliberate swopping of DNA samples✓
- A person's DNA may be in the crime scene before the crime✓

Any (1)

(Mark the FIRST ONE only)

(c) Every individual has a unique DNA✓/only identical twins share the same DNA (1)

2.2.2 - Some black bands of the child's DNA profile must match the mother's✓
- and the remaining bands must match with the biological father's✓ (2
(5)

2.3 2.3.1 (a) Graafian follicle✓/ovary (1)

(b) Pituitary✓ gland (1)

2.3.2 (a)
- High LH levels✓
- stimulates ovulation✓
- then the formation of corpus luteum✓
- increasing progesterone level✓ Any (3)

(b)
- Low levels of oestrogen✓
- causes the endometrium not to thicken✓
- reducing the chances of implantation✓
- Therefore no pregnancy Any (3)
(8)

2.4 2.4.1 (a) E✓ (1)

(b) A✓ (1)

2.4.2
- Radial muscles contract✓
- Circular muscles relax✓ (2)

2.4.3
- Blurred near vision✓
- Eye strain✓
- Holding reading material at a distance✓ Any (2)

(Mark the FIRST TWO only)

2.4.4 (a)
- The lens becomes less convex✓
- Refractive power decreases✓
- resulting in blurred near objects✓/long-sightedness (3)

(b)
- light stimulus will not be converted into an impulse✓
- no impulse will be sent to the cerebrum✓
- resulting in blindness✓ Any (2)
(11)

2.5 2.5.1
- Allows for a quick automatic response✓ to a stimulus
- to minimise body injuries✓ (2)

2.5.2
- Heat receptors (on the skin) convert the stimulus into an impulse✓
- which travels via the sensory neuron✓
- through the interneuron in the spinal cord✓
- Interneuron transmits the impulses to the motor neuron✓
- which carries impulses to the hand/arm muscles✓
- The muscles contract to pull away the hand✓ from the heat Any (5)

(7)

2.6
- The pinna traps and directs sound waves into the auditory canal✓
- Causing the tympanic membrane to vibrate✓ as sound waves strike it
- The vibrations are transferred to the ossicles✓
- The ossicles (hammer, anvil, stirrup) amplify and transmit vibrations to the oval window✓
- Vibrations create pressure waves in the endolymph✓/fluid of the cochlea
- The organ of Corti is stimulated✓
- The stimulus is converted into a nerve impulse✓
- The auditory nerve carries the impulse to the cerebrum✓ for interpretation

Any **(6)**

[50]

QUESTION 3

3.1 3.1.1 Karyotype✓ (1)

3.1.2 Homologous pair✓ of chromosomes (1)

3.1.3
- Same size✓
- Same shape✓
- Same position of centromeres✓
- Genes on the same loci✓
- Carry the same type of genes✓ Any (2)

(Mark the FIRST TWO only)

3.1.4 45✓ (1)

3.1.5 (23rd pair) has XY chromosomes✓ (1)

(Mark the FIRST ONE only)

3.1.6 (a) 18✓ (1)

(b) 23✓ (1)

3.1.7
- Non-disjunction occurred in chromosome 18✓
- During anaphase I✓/II
- Resulting in a gamete with an extra chromosome✓/24 chromosomes
- Which fused with a normal gamete✓ (with 23 chromosomes)
- Resulting in a zygote with 47 chromosomes✓ Any (4)

(12)

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3.2 3.2.1 (a) GgLl✓✓ (2)

(b) 9 Green body with Long arms: 3 Green body with short arms:
3 Blue body with Long arms: 1 Blue body with short arms✓✓ (2)

3.2.2 $\frac{3}{16}$ ✓ × 100✓

= 18,75✓% / 19% (3)
(7)

3.3 3.3.1 X^hX^h✓ (1)

3.3.2 (a)
- Energy levels will be low in affected✓ individuals
- due to low rate of cellular respiration✓
- as a result of reduced oxygen carrying capacity✓ (3)

(b)
- Female whales have 2 X-chromosomes✓
- therefore need to inherit 2 recessive alleles✓/X^hX^h
- while males have one x-chromosome✓
- therefore needing to inherit just one recessive allele✓/X^hY in order to be affected✓ Any (3)

3.3.3

P_1 Phenotype	Male without sideroblastic anaemia	×	Female without sideroblastic anaemia✓	
Genotype	X^HY	×	X^HX^h✓	
Meiosis G/Gametes	X^H Y	×	X^H	X^h✓
Fertilisation				
F_1				
Genotype	X^HX^H	X^HX^h	X^HY	X^hh✓
Phenotype P_1 and F_1 ✓ Meiosis and fertilisation✓	2 females without sideroblastic anaemia		Male without sideroblastic anaemia	Male with sideroblastic✓ anaemia

25%✓*

OR

P_1 Phenotype	Male without sideroblastic anaemia	×	Female without sideroblastic anaemia✓
Genotype	X^HY	×	X^HX^h✓

Meiosis

Fertilisation

F_1

✓Male without sideroblastic anaemia

Female without sideroblastic anaemia

Gametes	X^H	X^h
X^H	X^HX^H	X^HX^h
Y	X^HY	X^hY

Phenotype

2 females without sideroblastic	Male without sideroblastic	Male with sideroblastic✓

P_1 and F_1 ✓
Meiosis and fertilisation✓

(correct gametes)
✓ (correct genotype)

25%✓* *1 compulsory + Any (6)
(14)

3.4 3.4.1 (a) Adrenalin levels✓ (1)

(b) Exercise intensity✓ (1)

3.4.2 (a)
- Ask permission from participants
- Decide on the sample size✓
- Decide on the time, date and venue✓
- Decide on the type and duration of exercise for each group✓
- Decide on the measuring tool✓/method Any (2)

(Mark the FIRST TWO only)

(b)
- Diet✓
- The person measuring adrenalin✓
- Duration of rest between exercises✓
- Blood samples must be collected at the same time of the day

(Mark the FIRST TWO only) Any (2)

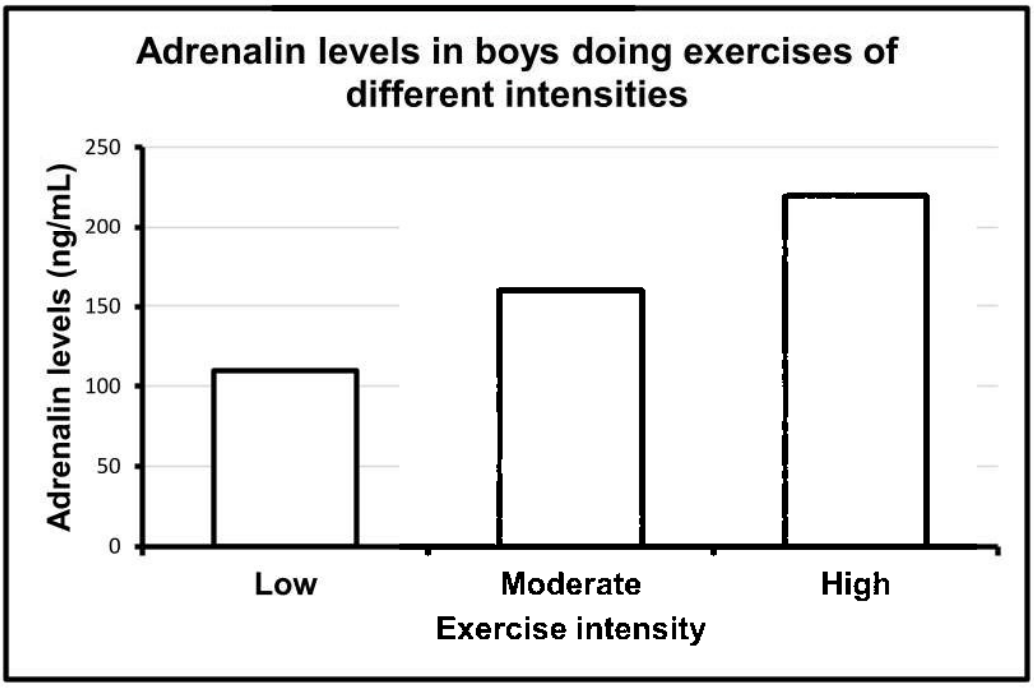
(c)
- 10 boys in each group participated✓/ 30 boys participated
- Exercise was done for 5 consecutive days✓
- Average adrenalin level was calculated✓ Any (2)

(Mark the FIRST TWO only)

3.4.3
- To obtain a baseline✓
- to verify that the change in adrenalin levels are due to exercise✓ Any (2)

3.4.4 The increase in exercise intensity increases adrenalin levels in the body✓✓ (2)

3.4.5



Criteria	Elaboration	Mark
Correct type of graph (**T**)	Bar graph drawn	1
Caption of graph (**C**)	Both variables included	1
Axes labels (**L**)	X- and Y-axis correctly labelled and correct unit for both axes	1
Scale for X- and Y-axes (**S**)	X-axis - equal width of bars & spaces between bars Y-axis – correct scale	1
Plotting (**P**)	1 to 2 bars plotted correctly All three bars plotted correctly	1 2

If a histogram or line graph is drawn, marks will be lost for:
• Type of graph and scale
If axes are transposed:

- Can get all marks if labels are also swopped and points correlate with axes
- If labels are not corresponding with axes, then:
  - Marks will be lost for labels and scale
  - Plotting can get credit if the bars are correct for given labels

(6)
(18)
[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150

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