



Province of the
EASTERN CAPE
EDUCATION

LIFE SCIENCES

COMMON TEST – JUNE 2014

MEMORANDUM

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

MARKS: 150

This memorandum consists of 11 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES 2012

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 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 is incorrect, do not credit. If sequence and links becomes correct again, resume credit.
9. **Non-recognised abbreviations**
Accept if first defined in answer. If not defined, do not credit the unrecognized 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 given in terminology**
Accept provided it was accepted at the National memo discussion meeting.

14. **If only letter is asked for and only name is given (and vice versa)**
No 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
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.

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	B✓✓		
	1.1.6	B✓✓		
	1.1.7	B✓✓		
	1.1.8	A✓✓		
	1.1.9	D✓✓		
	1.1.10	B✓✓	(10 x 2)	(20)
1.2	1.2.1	Nucleotide✓		
	1.2.2	Polypeptide✓		
	1.2.3	Autosomes✓		
	1.2.4	Biotechnology✓/genetic engineering/genetic modification		
	1.2.5	Recessive✓		
	1.2.6	Genotype✓		
	1.2.7	Uterus ✓		
	1.2.8	Precocial✓		
	1.2.9	External✓		
	1.2.10	Myelin sheath✓		(10)
1.3	1.3.1	Both A and B✓✓/Both		
	1.3.2	A only✓✓		
	1.3.3	A only✓✓		
	1.3.4	B only✓✓		
	1.3.5	A only✓✓		
	1.3.6	None✓✓	(6 x 2)	(12)
1.4	1.4.1	A – ciliary muscle✓/ body B – suspensory ligaments✓ D - cornea✓		(3)
	1.4.2	C✓ - iris✓		(2)
	1.4.3	Biconvex✓		(1)
	1.4.4	I✓		(1)
	1.4.5	II✓		(1)
				(8)
				[50]
			TOTAL SECTION A:	50

SECTION B

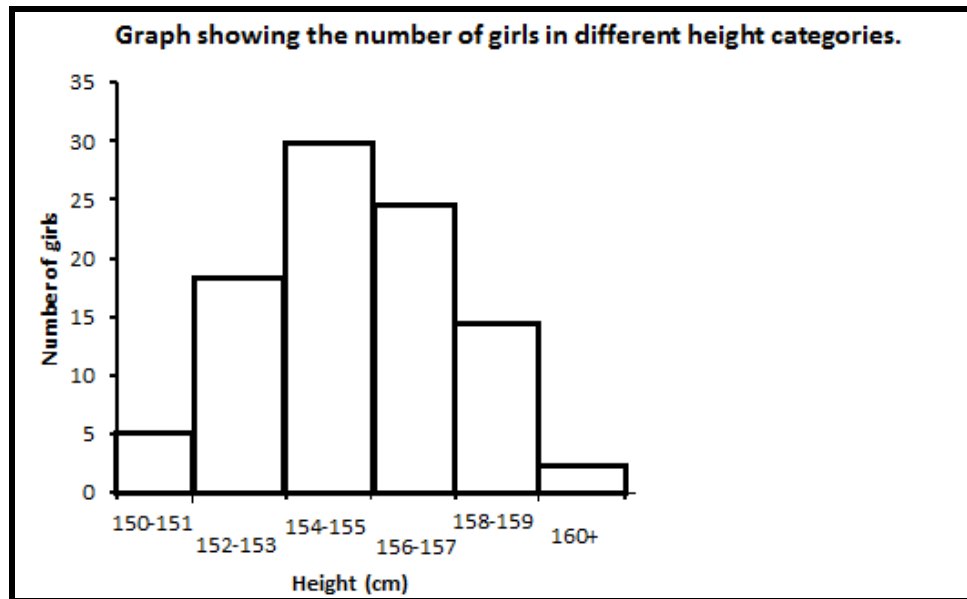
QUESTION 2

2.1	2.1.1	Y – tRNA✓ Z – mRNA✓	(2)
	2.1.2	Translation✓	(1)
	2.1.3	Codon✓	(1)
	2.1.4	3 – GAA✓	(1)
	2.1.5	1 – Thr✓/threonine 5 – Val✓/valine	(2) (7)
2.2	2.2.1	Thymine is present✓	(1)
	2.2.2	Gene✓ / point mutation	(1)
	2.2.3	- The order of the nitrogen bases is changed✓ - The third base triplet codes for a different amino acid✓ - This prevents the protein formed from functioning correctly✓ / leads to the formation of abnormal haemoglobin Any TWO	(2) (4)
2.3	2.3.1	C✓ D✓ A✓ (in the correct order)	(3)
	2.3.2	A – whole chromosomes are separating ✓ E – chromatids are separating✓	(2)
	2.3.3	Crossing over✓	(1)
	2.3.4	It introduces genetic variation✓ which ensures that the offspring are different to the parents✓ and this increases their chances of surviving ✓ Any TWO	(2)
	2.3.5	- Non-disjunction occurs✓ - during Anaphase I ✓ - where one pair of chromosomes fail to separate✓ - resulting in 11 chromosomes moving to one pole ✓ - and 9 chromosomes moving to the other pole✓	Max 4 (4) (12)

- 2.4 2.4.1 A – luteinising hormone✓ / LH (1)
- 2.4.2 16/17 – 28/29 ✓ (1)
- 2.4.3 Negative feedback mechanism*✓
 - increased levels of hormone D✓/ progesterone will inhibit✓
 formation of hormone B ✓/ follicle stimulating hormone
 - when levels of hormone D/ progesterone decreases✓, then
 B/ follicle stimulating hormone will be released✓ from the
 pituitary gland and its level will increase✓ (1* + Any THREE) (4)
- 2.4.4 - Follicles are released ✓
 - Follicle grows and matures into the Graafian follicle ✓
 - On approximately day 14 the ovum is released ✓
 - Process known as ovulation✓
 - The remains of the Graafian follicle becomes the corpus
 luteum✓
 - Under the influence of LH✓
 - The corpus luteum degenerates if fertilisation does not
 occur ✓ Any FOUR (4)
- 2.4.5 - The zygote divides by mitosis ✓
 - To form a solid ball of cells called the morula ✓
 - The morula becomes the blastocyst ✓/ blastula
 - The blastocyst/ blastula develops into the embryo ✓ which then
 attaches onto the endometrium Any THREE (3)
- 2.4.6 a) Day 14✓ (1)
- b) - The woman ovulated on day 16 or day 17✓
 - Indicating that the days of ovulation can vary✓ in woman
 - and if they avoided intercourse on Day 14, she could still
 fall pregnant✓ (3)
- (17)**
[40]

QUESTION 3

3.1 3.1.1

**Mark Allocation**

Correct type of graph	1
Title of graph	1
Correct label and scale for Y axis	1
Correct label, scale and unit for X axis	1
Plotting of bars for expected number of girls	all bars plotted correctly – 2 3-5 bars plotted correctly – 1 0-2 bars plotted correctly – 0

(6)

- 3.1.2
- Get permission to carry out their investigation✓
 - Draw up a table/survey sheet to record their results✓
 - Obtain the necessary equipment to measure peoples heights✓
 - Arrange a time/place to measure the girls✓
- Any THREE (3)

- 3.1.3
- Availability/quality of food✓
 - Amount of exercise✓
 - Production of growth hormones✓

Mark first TWO only

Any TWO

(2)

(11)

- 3.2 3.2.1 3✓ X^hY✓ (2)
- 3.2.2 a) 25✓% (2)
b) 50✓% (2)
- 3.2.3 - Trace history of disease in the family✓
- Determine chances of their offspring being affected✓
- Check if the female is a carrier or not✓
- Help them make a decision whether to have children or not✓
- Counselling on raising a child with haemophilia✓ Any THREE (3)

3.2.4 P₁ phenotype Affected male x Unaffected female✓
genotype X^hY x X^HX^h✓
Meiosis

X^h; Y x X^H; X^h✓

Fertilization

OR

gametes	X ^h	Y
X ^H	X ^H X ^h	X ^H Y
X ^h	X ^h X ^h	X ^h Y

1 mark for correct gametes
1 mark for correct genotypes

F₁ genotype X^HX^h; X^HY; X^hX^h; X^hY✓
phenotype 1 unaffected female

1 unaffected male

1 affected female

1 affected male✓

Allocation of marks

Showing the P1 and F1 generation ✓

Showing meiosis and fertilisation ✓

Max 6 (6)

(15)

- 3.3 3.3.1 black feathers, red beaks✓ (1)
- 3.3.2 rooster - FFBb✓ (2)
hen - ffbb✓
- 3.3.3 FB✓ (2)
Fb✓
- 3.3.4 FfBb ✓ ; Ffbb✓ (2)
(7)

- 3.4
- Cristae✓
 - in the ampullae✓/ at the base of the semi-circular canals✓
 - are stimulated by changes in direction and speed ✓

 - Maculae✓
 - in the utricle and saccule ✓
 - are stimulated by changes in the position of the head✓/ body

 - These stimuli are converted into impulses✓
 - which are transmitted via the auditory nerve ✓
 - to the cerebellum✓

 - The cerebellum sends appropriate impulses via motor neurons✓
 - to the muscles of the body✓ to maintain/ restore balance in the body
- Max 7 (7)
[40]
- TOTAL SECTION B: 80**

SECTION C

QUESTION 4

Hearing

- Sound waves✓
- are directed by the pinna ✓
- through the auditory✓ canal
- to the tympanic membrane✓ / eardrum
- causing it to vibrate✓

- Vibrations are transferred to the ossicles ✓of the middle ear
- the stirrup ✓causes membrane of the oval✓ window to vibrate
- and sets up pressure waves in the perilymph ✓
- of the cochlea ✓
- which are then transferred to the endolymph✓
- stimulating the hair cells in the organ of Corti✓
- which then converts the stimulus to an impulse✓
- which will be transmitted along the auditory nerve to the cerebrum✓ where the sound will be interpreted as a growl

Max 9

Reflex Action/Touch

- The receptors ✓ in the skin of the leg
- will receive the stimulus✓ and
- convert it into an impulse✓
- which will travel along the sensory ✓neuron
- to the spinal cord✓

- The sensory neuron will enter the spinal cord along the dorsal ✓root
- of the spinal nerve✓
- In the grey matter the sensory neuron will make synaptic✓ contact with the connector neuron✓
- which in turn will make synaptic contact with the motor✓ neuron

- The impulses are then transmitted by the motor neuron✓,
- via the ventral✓ root of the spinal nerve
- to the effector✓ organ/ the muscles in the leg
- causing it to contract and pull away ✓

Max 8

Content (17)

Synthesis (3)

(20)

Marks for synthesis

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 hearing and reflex action have been included. (There is no irrelevant information)	The process involved in hearing and the reflex action are presented in the correct sequence	At least half of both processes of hearing and reflex action are described correctly
Mark	1	1	1

**Synthesis (3)
[20]**

**TOTAL SECTION C: 40
GRAND TOTAL: 150**