



education

Department:
Education
PROVINCE OF KWAZULU-NATAL

LIFE SCIENCES

COMMON TEST - JUNE 2019

MARKING GUIDELINE

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

MARKS: 150

This memorandum consists of 10 pages.

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.

SECTION A**QUESTION 1**

1.1	1.1.1	C✓✓		
	1.1.2	A✓✓		
	1.1.3	B✓✓		
	1.1.4	B✓✓		
	1.1.5	C✓✓		
	1.1.6	B✓✓		
	1.1.7	C✓✓		
	1.1.8	A✓✓		
	1.1.9	No correct answer		
	1.1.10	No correct answer	(8 x 2)	(16)
1.2	1.2.1	Nucleotide✓		
	1.2.2	Cloning✓		
	1.2.3	Ovovivipary✓/ovoviviparous		
	1.2.4	Locus✓		
	1.2.5	Colour blindness✓		
	1.2.6	Stem cells✓		
	1.2.7	Maculae✓		
	1.2.8	Incomplete✓dominance		
	1.2.9	Homozygous✓		
	1.2.10	Cytokinesis✓	(1 x10)	(10)
1.3	1.3.1	A only✓✓		(2)
	1.3.2	A only✓✓		(2)
	1.3.3	B only✓✓		(2)
	1.3.4	Both A and B✓✓		(2)
				(8)
1.4	1.4.1	Testosterone✓		(1)
	1.4.2	- Brings about the development of secondary sexual characteristics✓/deepens the voice/promotes growth of pubic hair/cause sex organs to grow bigger/ promotes muscle growth in males - Stimulates the production of sperms✓		(2)
				Mark first TWO only
	1.4.3	G – Ovary✓ C – Cowper's✓ gland		(2)
	1.4.4	It attaches the foetus✓/embryo		(1)
	1.4.5	(a) H✓ – Uterine wall✓/Uterus (b) F✓ – Urethra✓ (c) A✓ – Fallopian tube✓/oviduct		(2) (2) (2)
				(12)

TOTAL SECTION A: 46

SECTION B

QUESTION 2

2.1 2.1.1 W – Nuclear membrane✓ (1)
Z – Peptide✓ bond (1)

2.1.2 Transcription✓*
- DNA double strand unwinds✓
- and unzips✓
- When the hydrogen bonds break✓
- one strand acts as a template✓
- to form mRNA✓
- using free nucleotides from the nucleoplasm✓
- The mRNA is complementary to the DNA✓
- The coded message for protein synthesis is thus copied onto mRNA✓
(Compulsory mark) 1* + Any 5 (6)

2.1.3

DNA	Molecule Y/tRNA
Long strand✓	Shorter strand✓
Double stranded✓	Single stranded✓
Has thymine✓	Has uracil✓
Deoxyribose sugar✓	Ribose sugar✓
Helical shape	Clover-leaf shape

Mark the first ONE only 1* table + 2 (3)

2.1.4 Tyrosine✓ Asparagine✓ Valine✓ (3)
(In the correct order)

2.1.5 - No effect on the protein✓
- Since the new tRNA will still bring Valine✓ (2)
(16)

2.2 2.2.1 Grey✓ (1)

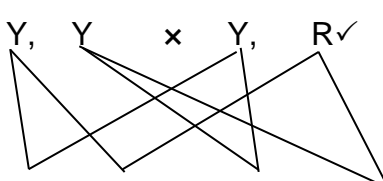
2.2.2 (a) Grey eyes and black tail✓ (1)
(b) Red eyes and black tail✓ (1)

2.2.3 (a) Ggbb✓ (1)
(b) GgBb✓ (1)

2.2.4 - A monohybrid cross involves one characteristic✓
- while a dihybrid cross involves two characteristics✓ (2)
(7)

2.3 2.3.1 Co-dominance✓ (1)

2.3.2 P₁ Phenotype Yellow × Yellow-red ✓
 Genotype YY × YR ✓
 Meiosis
 G/Gametes Y, Y × Y, R ✓
 Fertilisation
 F₁ Genotype YY YR YY YR ✓
 Phenotype 2 Yellow ; 2 Yellow-red ✓
 P₁ and F₁ ✓
 Meiosis and fertilisation ✓



Any 6

OR

P₁ Phenotype Yellow × Yellow-red ✓
 Genotype YY × YR ✓
 Meiosis

Fertilisation

F₁

Gametes	Y	Y
Y	YY	YY
R	YR	YR

✓ (correct gametes)
 ✓ (correct genotype)

Phenotype 2 Yellow nectarines 2 Yellow-red nectarines ✓
 P₁ and F₁ ✓
 Meiosis and fertilisation ✓

Any 6 (6)

2.4 2.4.1 Genetic engineering ✓/modification/manipulation/recombinant DNA technology (1)

2.4.2 (a) Crop yield ✓ (1)

- (b) Pesticide gene in maize✓ (1)
- 2.4.3 Maize without the pesticide gene grown in the greenhouse✓ (1)
- 2.4.4 The maize grown inside the greenhouse had more yield than the maize grown on the field✓✓.
- OR**
- Maize grown in a field had less yield than the maize grown in the greenhouse✓✓.
- OR**
- Maize plants (with the pesticide gene/without the pesticide gene) produces a greater yield✓✓. (2)
- 2.4.5 Maize plants with the pesticide gene had more yield than maize plants without the pesticide gene✓✓
- OR**
- Insertion of the pesticide gene in maize plants improves crop yield✓✓
- OR**
- Maize plants grown in a greenhouse have a higher yield than those grown in the field✓✓ (2)
- 2.4.6 - Large samples were grown✓
- Investigation was repeated✓/done for 5 years
(Mark first TWO only) (2)
(10)

QUESTION 3

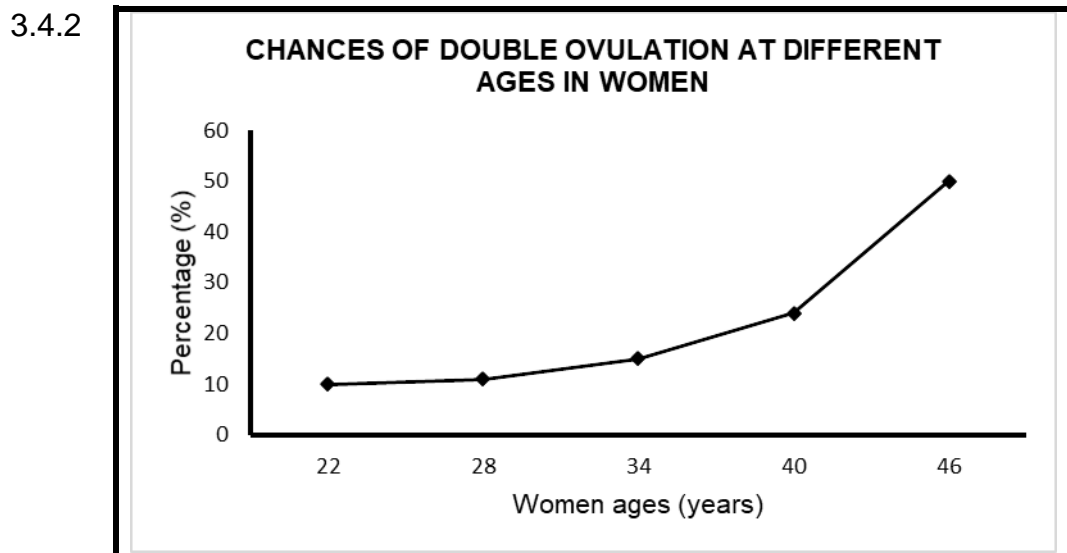
- 3.1 3.1.1 A – Ossicles✓ (1)
B – Oval window✓ (1)
- 3.1.2 C – Absorbs pressure waves from the inner ear to prevent distortion of sound✓/stop the vibrations of sound waves (1)

- D – Equalises pressure on either side of the tympanic membrane✓. (1)
- 3.1.3 It will not vibrate✓ causing hearing impairment✓/loss. (2)
- 3.1.4 - Pinna traps✓/directs the sound waves
 - into the auditory canal✓/meatus
 - This causes tympanic membrane to vibrate✓
 - The vibrations are transmitted to the auditory ossicles✓
 - The ossicles transmit the vibrations✓
 - to the oval window✓
 - The oval window vibrates✓
 - transmitting vibrations to the cochlea
 - which stimulates the organ of corti✓
 - to convert the waves into an impulse✓
 - The impulse travels along the auditory nerve✓
 - to the cerebrum where it is interpreted✓.
- Any 7 (7)**
- 3.2 3.2.1 A – Cell membrane✓ (1)
 D – Chromatid✓ (1)
- 3.2.2 Meiosis I✓ (1)
- 3.2.3 Chromosomes are still double stranded✓ (1)
- 3.2.4 Anaphase I✓ (1)
- 3.2.5 Joins/holds two chromatids together✓ (1)
- 3.2.6 C - Centriole✓
 - forms spindle fibres✓/threads. (2)
- 3.2.7 4✓ (1)
- 3.2.8 Crossing-over✓*
 - Two adjacent chromatids of a homologous pair overlap✓/cross over
 - at a point called chiasma✓/chiasmata
 - Results in the exchange of genetic material ✓/DNA segment
- OR**
- Random arrangement✓*
 - Homologous chromosomes✓
 - arrange themselves at the equator✓randomly
 - during metaphase 1✓
- 1* + Any 3 (4)
(13)
- 3.3 3.3.1 Nucleus✓ (1)
- 3.3.2 Luteinising Hormone✓LH (1)
- 3.3.3 For gamete **A** all four✓ cells mature

For gamete **B** only one ✓ cell matures. (2)

- 3.3.4 - It contains mitochondria ✓
 - which release energy ✓
 - to enable sperms to swim. ✓
- Any 2** (2)
(6)

3.4 3.4.1 An increase in the mother’s age increases the chances of double ovulation ✓✓. (2)



Mark allocation of the graph

Criteria	Mark allocation
Correct type of graph (T)	1
Title/Caption of the graph	1
Correct scale for X-axis and Y-axis (S)	1
Correct label for X-axis and Y-axis (L)	1
Plotting of the graph (P)	0: No point plotted correctly 1: 1 to 4 points plotted correctly 2: All 5 points plotted correctly

(6)
(8)
[40]

TOTAL SECTION B: 80

SECTION C

QUESTION 4

Brain parts and functions

Cerebrum✓*

- Responsible for higher thoughts✓
- Controls voluntary actions✓
- Interprets sensations✓

Any 1

Cerebellum✓*

- Maintains balance and equilibrium✓
- Co-ordinates voluntary muscle movements✓

Any 1

Corpus callosum✓*

- Integrates impulses between the two cerebral hemispheres✓
- Connects the two cerebral hemispheres✓

Any 1

Medulla oblongata✓*

- Controls involuntary reflexes✓/breathing/swallowing/body temperature/heart beat/digestion/sleep.

4* compulsory + 4 = 8

Accommodation (Near vision)

- Ciliary muscles contract✓
- Suspensory ligaments slacken✓
- The lens becomes more biconvex✓/convex/fatter/rounder
- Tension on the lens decreases✓
- Refractive power of the lens increases✓
- Light is refracted/bent more✓
- Clear image of text is formed on the retina✓

Max 5

Autonomic nervous system

- Every organ or gland is controlled by two sets of nerves✓/double innervations
- that act antagonistically✓
- to control involuntary events✓/brings about homeostasis
- Sympathetic✓ nerves
- stimulates a response✓
- Parasympathetic✓ nerves
- inhibits a response✓

Max 4
Content: (17)
Synthesis: (3)
(20)

ASSESSING THE PRESENTATION OF THE ESSAY

Relevance	Logical sequence	Comprehensive
All information provided is relevant to the topic	Ideas arranged in a logical/ cause-effect sequence	Answered all aspects required by the essay

Only information about the parts and functions of the brain, accommodation and autonomic nervous system is given. No irrelevant information is given.	Information about - parts and functions of the brain - accommodation - autonomic nervous system is given in a logical sequence	- Parts and functions 6/8 - Accommodation = 3/5 - Autonomic nervous system = 2/4
1 mark	1 mark	1 mark

TOTAL SECTION C: 20
GRAND TOTAL: 146

Learner mark	Converted score
1 – 18	Remains the same
19 – 54	Add 1
55 – 91	Add 2
92 – 127	Add 3
128 - 146	Add 4