LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES PRE-MIDYEAR EXAMINATION ASSESSMENT MARKING GUIDELINES: MAY 2023.

Total Marks: 150
Duration: 2,5 HOURS

These marking guidelines consist of 9 pages including the cover page.

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 part of it is required**
   Read all and credit relevant part.

4. **If comparisons are asked for but 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-recognized 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. Indicate that the candidate's numbering is wrong.

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 National memo discussion meeting.

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

15. **If units are not given in measurements**
Memorandum will allocate marks for units separately, except where it isalready given in the question.

16. Be sensitive to **the sense of an answer, which may be stated in a different way**.

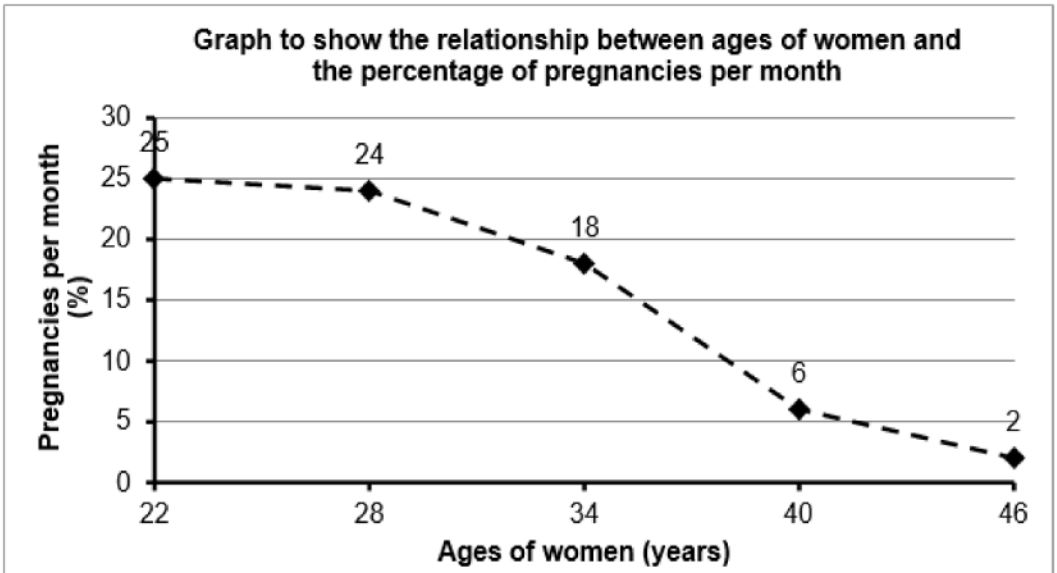
17. **Caption**
Credit will be given for captions to all illustrations (diagrams, graphs, tables, etc.) except where it is already given in the question.

SECTION A			
QUESTION 1			
1.1	1.1.1	B✓✓	
	1.1.2	C✓✓	
	1.1.3	B✓✓	
	1.1.4	B✓✓	
	1.1.5	C✓✓	
	1.1.6	D✓✓	
	1.1.7	B✓✓	
	1.1.8	A✓✓	
	1.1.9	C✓✓	
	1.1.10	B✓✓	
		(10 x 2)	**(20)**
1.2	1.2.1	Crossing over✓	1
	1.2.2	Scrotum✓	1
	1.2.3	Endometrium✓	1
	1.2.4	Epididymis✓	1
	1.2.5	Diploid✓	1
	1.2.6	Meiosis✓	1
	1.2.7	Reflex action✓	1
	1.2.8	Meninges✓	1
		(8 x 1)	**(8)**
1.3	1.3.1	B only✓✓	
	1.3.2	A only✓✓	
	1.3.3	B only✓✓	
	1.3.4	B only✓✓	
		(4 x 2)	**(8)**
1.4	1.4.1	(a) Hypophysis✓/Pituitary gland (b) Adrenal✓ gland	1 1
	1.4.2	(a) D✓ – Testis✓ (b) C✓ – Pancreas✓/Islets of Langerhans (c) A✓ – Hypophysis✓/Pituitary gland	2 2 2
			(8)
1.5	1.5.1	Motor✓ neuron	1
	1.5.2	(a) Nucleus✓/nuclear membrane (b) Cytoplasm✓ (c) Dendrite✓	1 1 1
	1.5.3	(a) C✓- Axon✓	2
			(6)
		TOTAL SECTION A	**50**

SECTION B **QUESTION 2**			
2.1	2.1.1	(a) DNA ✓ (b) Ribosome ✓	1 1
	2.1.2	(a) G ✓ (b) U ✓	1 1
	2.1.3	– DNA codes for a particular protein ✓ but cannot leave nucleus – One strand of DNA is used as a template ✓ – to form mRNA ✓	3
	2.1.4	– According to the codons on mRNA ✓ – tRNA molecules with matching anticodons ✓ – bring the required amino acids to the ribosome ✓ – This is called translation ✓ – The amino acids become attached by peptide bonds ✓ – to form the required protein ✓ (any 4)	4
	2.1.5	- A gene mutation affects arrangement/type of the nitrogen bases/nucleotides✓ - This changes the code on the DNA ✓ - which changes the code on the RNA✓ - A different amino acid✓ may be coded for - which causes a change in the amino acid sequence in✓ the protein - leading to the formation of a different/alternate/no protein✓ ANY 5	5
			(16)
2.2	2.2.1	23✓	1
	2.2.2	(a) Centromere✓ (b) Chiasma✓/chiasmata	1 1
	2.2.3	Ovary✓	1
	2.2.4	(a) Crossing over✓ (b) Prophase I✓ (c) ova✓/gametes/sex cells	1 1 1
	2.2.5	C→ B→ A✓(correct sequence)	1
			(8)
2.3	2.3.1	(a) White✓fur (b) Black✓fur	
	2.3.2	(a) 1✓ and 3✓ *(Mark first TWO only)* (b) 1✓ *(Mark first ONE only)*	2 1

	2.3.3	**P_1** Phenotype: Black X White✓ Genotype: BB X bb✓ *Meiosis* **G**/gametes: B, B X b, b✓ *Fertilisation* **F_1** Genotype: Bb; Bb, Bb; Bb ✓ Phenotype: All black *0✓%white P_1 and F_1✓ Meiosis and fertilisation✓ **(*compulsory mark + 5)** **OR** **P_1** Phenotype: Black X White✓ Genotype: BB X bb✓ *Meiosis* *Fertilisation* Gametes: B, B / b: Bb, Bb / b: Bb, Bb 1 mark for correct gametes 1 mark for correct genotypes **F_1** Phenotype: All black *0✓% white P_1 and F_1✓ Meiosis and fertilisation✓ **(* compulsory mark + 5)**	6
			(11)
2.4	2.4.1	(a) X^AY✓✓ (b) X^AX^a✓✓	2 2
	2.4.2	$\left[\frac{3}{7} \times 100\right]$ ✓ $= 42{,}86$✓/42,9/43%	2
	2.4.3	- An affected female carries two/only recessive alleles✓/X^aX^a - Sons/males inherit one X chromosome✓ from their mothers - Sons/males need only one recessive allele to be affected✓ - And therefore must inherit X^a from their mother✓ Any 3	3
			(9)
2.5	2.5.1	Contain the same chromosomes ✓because the embryonic cell has divided by mitosis ✓/ they are all produced from nuclei of the donor sheep✓ which multiply / divide by mitosis✓ therefore have the same DNA ✓	2

	2.5.2	The nucleus and genetic material ✓originated from another sheep ✓ / the nuclei of the foster sheep were not used ✓and therefore did not contain the same genetic material / the ova used did not contain nuclei✓ / it is the nucleus which contains the genetic material ✓	2
	2.5.3	Animals or plants with superior / favourable characteristics ✓ can be produced to enhance food production ✓ / biotechnology.	2
			(6)
			[50]
QUESTION 3			
3.1	3.1.1	C✓ – Medulla Oblongata✓	2
	3.1.2	A ✓- Cerebrum✓	2
	3.1.3	D✓ - Cerebellum✓	2
			(6)
3.2	3.2.1	A ✓ – aqueous humour / fluid ✓	2
	3.2.2	F ✓ – yellow spot / fovea centralis ✓	2
	3.2.3	B ✓ – iris ✓	2
			2
			(6)
3.3	3.3.1	A – Tympanic membrane✓/ Tympanum/Eardrum C – Oval window✓/fenestra ovalis D – Round window✓/fenestra rotunda	3
	3.3.2	B – transmit vibrations✓ from the tympanic membrane to inner ear/ amplifies sound waves D – prevents pressure build up of waves✓/absorbs pressure wave set up by tympanic canal of the inner ear/eases sound waves out of inner ear/ prevents sound waves from moving backwards in perilymph	2
	3.3.3	Tympanic membrane/A has a larger surface area✓ than the oval window✓/C	2
	3.3.4	Ossicles will not vibrate freely ✓ to transmit vibrations to the inner ear✓/ causing partial deafness **OR** Cannot equalise pressure ✓on either side of tympanic membrane leading to pain✓/ middle ear infection/ a burst eardrum ✓vibrations not being transmitted/ partial deafness Any (1 x 2)	2
			(9)

3.4	3.4.1	External ✓ fertilization	1
	3.4.2	- A large amount of sperm is released ✓ - A large amount of eggs is released ✓ - The male and female swim close to each other ✓/the sperm is released close to the eggs (Any 2) **(Mark first TWO only)**	2
	3.4.3	- No danger of drying out ✓	2
			(5)
3.5	3.5.1		6

Mark allocation of the graph

Criteria	Mark Allocation
Correct type of graph drawn for the pregnancies per month only	1
Title of graph including the two variables (Age of women and pregnancies per month)	1
Correct label and unit for X-axis and Y-axis	1
Correct scale for X-axis and Y-axis	1
Drawing of the graph	0: No points plotted correctly 1: 1 to 4 points plotted correctly 2: All 5 points plotted correctly

	3.5.2	The older the women, the higher the chances of having miscarriages✓✓ **OR** The younger the women, the lower the chances of having miscarriages✓✓	2
			(8)
3.6	3.6.1	A – Middle piece ✓ B—acrosome ✓	1 1
	3.6.2	Mitochondria : ✓supplies energy ✓ for locomotion of the sperm cell Tail : ✓can propel forward ✓for swimming/locomotion of the sperm cell.Torpedo shape : ✓reducing friction ✓ **(MARK FIRST TWO ONLY)**	4
			6
3.7	3.7.1	(a) Amount of thyroxin✓ (b) Body weight✓	1 1
	3.7.2	- Same number of rats in each group✓ - All rats were of the same species✓ - All groups were investigated for the same period of time✓ - All rats were the same gender✓ - All groups were weighed after the same interval✓ (Any 3) **(Mark first THREE only)**	3
	3.7.3	Group A✓	1
	3.7.4	- Low thyroxin levels✓ - will lead to low metabolic rate✓ - Therefore the energy from the diet is used very slowly✓ - and more organic compounds are stored✓ (Any 3)	3
	3.7.5	Group B✓	**1**
			(10)
			[50]
		GRAND TOTAL	**150**