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DEPARTMENT OF EDUCATION
DEPARTEMENT VAN ONDERWYS
LEFAPHA LA THUTO
ISEBE LEZEMFUNDO

PROVINCIAL PREPARATORY EXAMINATION

GRADE 12

LIFE SCIENCES P2

SEPTEMBER 2024

MEMO

MARKS: 150

These marking guidelines consist of 13 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 part of it is required**
Read all and credit 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 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 provincial memo discussion meeting.
14. **If only letter is asked for, but only 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, drawings, 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 learner's 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 consent of the examiner and internal moderator.

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SECTION A**QUESTION 1**

1.1	1.1.1	A✓✓		
	1.1.2	A✓✓		
	1.1.3	B✓✓		
	1.1.4	B✓✓		
	1.1.5	D✓✓		
	1.1.6	D✓✓		
	1.1.7	B✓✓		
	1.1.8	D✓✓		
	1.1.9	C✓✓	(9 x 2)	(18)
1.2	1.2.1	Non-disjunction✓		
	1.2.2	Haemophilia✓		
	1.2.3	Locus✓		
	1.2.4	Ovary✓		
	1.2.5	Chloroplast✓ DNA		
	1.2.6	Haploid✓		
	1.2.7	Ribosome✓		
	1.2.8	Mitosis✓		
	1.2.9	Incomplete✓ dominance	(9 x 1)	(9)
1.3	1.3.1	B only✓✓		
	1.3.2	Both A and B ✓✓		
	1.3.3	B only✓✓	(3 x 2)	(6)
1.4	1.4.1	GCG✓ AUA✓ ACC✓		(3)
	1.4.2	Arginine✓ Tyrosine✓ Tryptophan✓		(3) (6)
1.5	1.5.1	Rrdd✓✓/ddRr and rrDd✓✓/Ddrr		(4)
	1.5.2	Rd✓/dR rd✓/dr (Mark first TWO only)		(2) (6)



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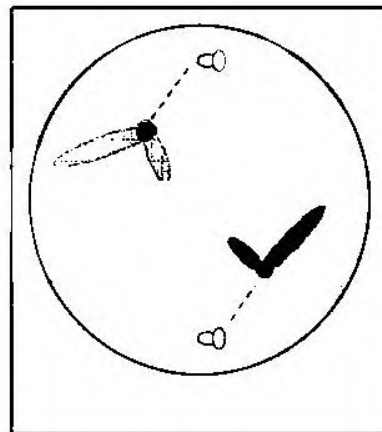
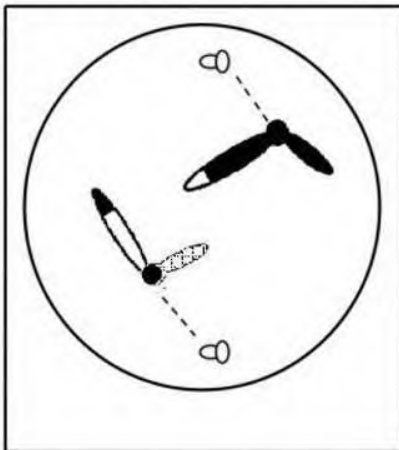
1.6	1.6.1	46✓/23 pairs	(1)
	1.6.2	Autosomes✓	(1)
	1.6.3	Male✓	(1)
	1.6.4	- The gonosomes✓/chromosome pair 23/sex chromosomes - are not identical✓/XY	(2) (5)

TOTAL SECTION A: 50

SECTION B**QUESTION 2**

- 2.1 2.1.1 (a) **X** - centromere✓/chromatid (1)
- (b) **Y** - chiasma(ta)✓ (1)
- 2.1.2 (a) No✓ (1)
- (b) - The cells have only 2 chromosomes✓/1 pair of chromosomes
- Human cells have 46 chromosomes✓/23 pairs of chromosomes (2)
- 2.1.3 B, D, A, C✓✓
(Two or nothing) (2)
- 2.1.4 - Crossing over✓
- takes place during Prophase I✓
- The **random** arrangement of chromosomes at the **equator**✓
- during Metaphase✓(I or II) (4)

2.1.5

TWO EXAMPLES of a cell – any possible combination of chromatids is possible**Guideline for assessing the diagram: mark independently**

Cell is drawn, centrioles and spindle fibres are present	(D)	1
2 chromatids	(N)	1
Chromatids moving towards poles	(P)	1
Correct shading chromatids (any combination of the shaded chromatids as above)	(S)	1

(4)
(15)

- 2.2 2.2.1 Molecule 1 - DNA✓
Molecule 2 - RNA✓/mRNA (2)

2.2.2

T✓

DNA	RNA
Contains deoxyribose✓sugar	Contains ribose✓ sugar
Double✓ helix	Single✓ stranded
Contains the nitrogenous base thymine✓/T	Contains the nitrogenous base uracil ✓/U
Found in the nucleus only✓	Found in the nucleus, ribosomes and cytoplasm of cells✓

(Mark first THREE only)

1 mark for table + Any (3 x 2)

(7)

2.2.3

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 mark + any other 5)

(6)
(15)

- 2.3 2.3.1 - A change in the sequence✓ of
- nitrogenous bases✓/nucleotides in a gene/DNA (2)

- 2.3.2 Pedigree✓diagram (1)

- 2.3.3 6✓ (1)

- 2.3.4 -Individual 3: aa✓
-Individual 4 Aa✓ (2)



2.3.5 IF ANOTHER LETTER IS USED, CANDIDATES WILL LOSE MARKS FOR P₁ AND F₁ GENOTYPES

P₁ phenotype achondroplasia X achondroplasia✓
 genotype Aa X Aa✓

Meiosis

Gametes/G A a A a ✓

Fertilisation

F₁ genotype AA Aa Aa aa ✓

phenotype 3/75% achondroplasia
 1/25% not achondroplasia✓*

P₁ and F₁✓

Meiosis and fertilisation✓

1 Compulsory mark + Any 5

OR

P₁ phenotype achondroplasia X achondroplasia✓
 genotype Aa X Aa✓

Meiosis

fertilisation

Gametes	A	a
A	AA	Aa
a	Aa	aa

1 mark for correct gametes
 1 mark for correct genotypes

F₁ phenotype 3/75% achondroplasia
 1/25% not achondroplasia✓*

P₁ and F₁✓

meiosis and fertilisation✓

1 Compulsory mark + Any 5 (6)

2.3.6 $\frac{20}{100} \checkmark \times 2\,416 \checkmark = 483 \checkmark / 483,2$

Accept range 10 – 20 AND adjust answer accordingly

(3)
 (15)



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- | | | | |
|-----|-------|--|-----------------|
| 2.4 | 2.4.1 | Genetic modification ✓/engineering | (1) |
| | 2.4.2 | <p>Pigs have been modified not to get a disease ✓
therefore, more food will be available ✓/increased food security/less money wasted on medication</p> <p>Mosquitoes have been modified produce an offspring that will not reach adulthood ✓
therefore, less diseases ✓/less money wasted on medication</p> <p>Cows have been modified to produce milk similar to human milk ✓
therefore, healthier for humans ✓/easier to digest</p> <p>Chickens have been modified not to get a disease/Asian flu ✓
therefore, more food will be available ✓/increased food security/less money wasted on medication</p> | |
| | | (Mark first TWO only) | Any (2 x 2) (4) |

(4)
(5)
[50]

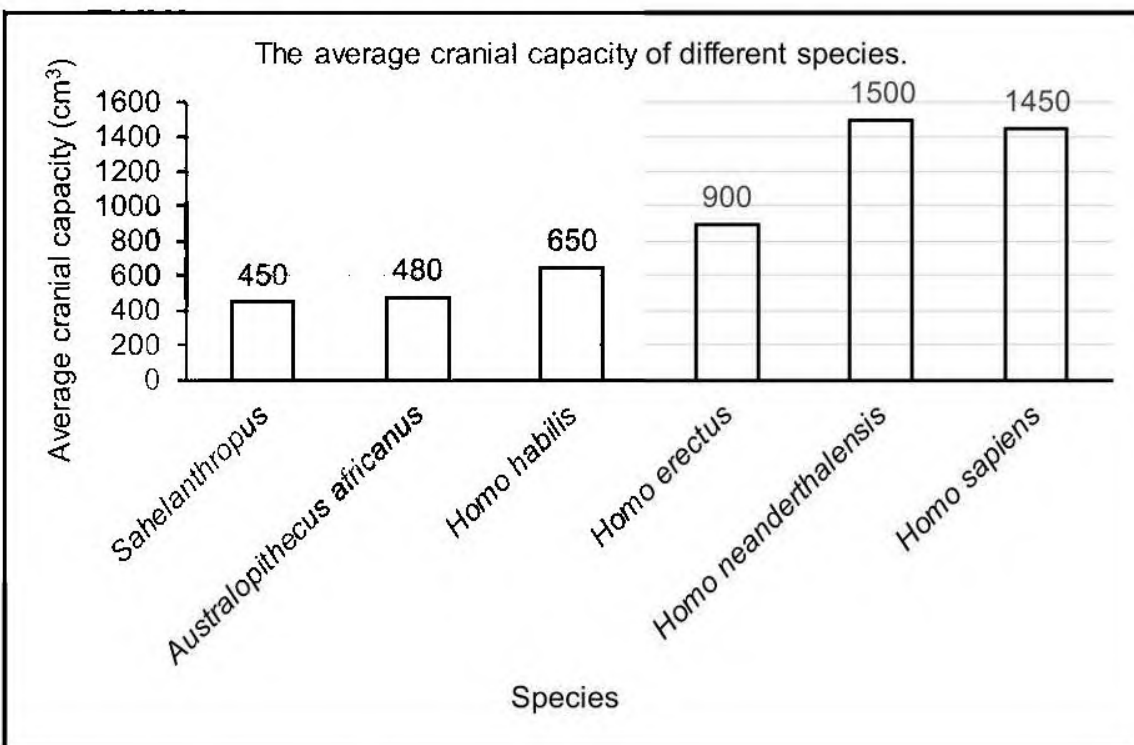
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QUESTION 3

- 3.1 3.1.1 - Hands are free to pick or carry food ✓ /to use tools and handle weapons/any example.
 - Standing upright gives a better, wider view ✓ of surroundings, a timelier warning of approaching predators or of potential prey.
 - Movement becomes easier ✓ and more energy efficient.
 - A more vertical posture reduces the body's exposure to sunlight ✓ when in an open area (60% less than for quadrupeds).
 - It also raises a large percentage of the body away from the hot ground, where it is exposed to cooling breezes. ✓
 - In courtship behaviour, the male sex organ is readily displayed. ✓ Any 4 (4)
- 3.1.2 - Foramen magnum is in a more forward position ✓
 - Spine is S-shaped ✓
 - Pelvis is short ✓
 - and wide ✓ /bowl-shaped (4)
- 3.1.3 *Homo sapiens* ✓ /H. sapiens (1)
 (9)
- 3.2 3.2.1 - Taung child ✓
 - Mrs Ples ✓
 - Little foot ✓
 (Mark first TWO only) Any 2 (2)
- 3.2.2 - Genetic ✓ evidence/ genetics
 - Cultural ✓ evidence (2)
- 3.2.3 - Genetic evidence:
 - The analysis of mitochondrial DNA ✓ / (mtDNA)
 -
 - Cultural evidence:
 - is the development /use of tools. ✓ /the use of fire/the use of art (2)
- 3.2.4 It increased in size ✓ /enlarged which means more intelligence ✓ (2)



3.2.5



Guideline for assessing the graph:

Type: bar graph	(T)	1
Caption for graph (contains both variables)	(C)	1
Scale for Y-axis and width of the bars AND spaces for X-axis	(S)	1
Label for X-axis and label and unit for Y-axis	(L)	1
Drawing of the bars	(B)	1: 1-5 bars drawn correctly 2: All bars drawn correctly

NOTE:

If the wrong type of graph is drawn:

- Marks will be lost for type (T)

If axes are transposed:

- Marks will be lost for labelling (L)

(6)

(14)



- 3.3 - There is a great deal of **variation in hair colour**✓ in humans/among the offspring.
 - Blond hair was caused by a mutation✓
 - Some people had blond hair, and some did not✓
 - There were more women than men✓ (Due to food shortages, many men died during hunting trips)
 - This led to **competition**✓ for a mate
 - People with blond hair (Blondes) were chosen✓
 - above people with other colour hair✓/example of hair colour
 - Reproduction took place✓
 - and the **allele/gene for the blond hair** was passed to their offspring✓
 - The next generation will therefore have a **higher proportion** of individuals with blond hair✓
 Any 8 (8)

- 3.4 3.4.1 - All giraffes had short necks✓ originally
 - Giraffes frequently stretched✓/used their necks to reach for leaves of tall trees✓
 - necks become longer✓
 - The long necks acquired✓
 in this way could be passed on to the next generation✓/
 were inherited (6)

- 3.4.2 **Acquired characteristics**✓ are not inherited✓/do not cause any change to the DNA of an organism's gametes (sperms or ova)

OR

Organisms did not evolve because they want to evolve✓✓/
 Lamarck's theory is deterministic (2)
 (8)

- 3.5 3.5.1 (a) A *species* is a group of organisms with similar characteristics✓ that can interbreed to produce fertile offspring.✓ (2)
- (b) A *population* is a group of organisms of the same species✓ living in the same habitat at the same time.✓ (2)

- 3.5.2 - Stamens contain pollen✓ grains in the anthers
 - Removing stamens prevents self-fertilisation of Population A.✓
 - It ensures pollination from Population B. ✓
 Any 2 (2)



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3.5.3	- (Same) amount of water✓ used on both populations - (Same) distance between the planted seeds✓ - (Same) type of soils used✓ - (Same) environmental conditions✓/amount of light/temperature for both populations - (Same) size of pots✓/containers	Any 2	(2)
3.5.4	- Increase the sample size (more seeds) for each of the populations✓ - Repeat the investigation✓ (Mark first ONE only)	Any 1	(1)
3.5.5	Population A and B are not the same species✓/are two different species.		(1)
3.5.6	None of the seeds germinated.✓/Inability to produce fertile seeds.		(1)
			(11)
			[50]
TOTAL SECTION B:			100
GRAND TOTAL:			150