



Province of the  
**EASTERN CAPE**  
EDUCATION



**NATIONAL  
SENIOR CERTIFICATE**

**KEREITE YA 12**

**LOETSE 2022**

**LIFE SCIENCES P2  
TATAISO YA HO TSHWAYA**

**MATSHWAO: 150**

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Tataiso ena ya ho tshwaya e na le maqephe a 10.

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**MELAO-METHEO E AMANANG LE HO TSHWAYA LIFE SCIENCES**

1. **Haeba ho fanwe ka dintlha tse ngata ho feta a dimaraka tse fanweng**  
Emisa ho tshwaya ha matshwao a hodimo a fihletswe ebe o beha mola wa wavy le 'max' ka lehlakoreng le letona la letsoho le letona.
2. **Haeba, ho etsa mohlala, ho hlokahala mabaka a mararo mme ho fanwe ka a mahlano**  
Tshwaya tse tharo tsa pele ho sa tsotelehe hore na kaofela kapa tse ding di nepahetse / di fosahetse.
3. **Haeba porosese yohle e fanwe, ha ho hlokahala feela karolo ya yona**  
Bala tsohle mme o fane ka dimaraka karolo e amehang.
4. **Haeba ho botswa papiso empa ho fanwe ka ditlhaloso.**  
Amohela haeba diphapano/ditshwano di hlakile.
5. **Haeba ho etsa theyibole ho hlokahala, empa ho fanwe ka serapana**  
Baithuti ba tla lahlehelwa ke dimaraka ka ho se kenye theyibole.
6. **Haeba didayakeramo di fanwe moo ho hlokahalang ditlhaloso.**  
Bahlahlobuwa ba tla lahlehelwa ke dimaraka.
7. **Haeba ditjhate tsa phallo di fanwe bakeng sa ditlhaloso.**Bahlahlobuwa bat la lahlehelwa ke dimaraka.
8. **Haeba tatellano e sithabeditswe mme mahokela a sa utlwahale** Moo tatellano le mahokela a nepahetseng, fana ka dimaraka. Ha tatellano le mahokela a fosahetse, o se ke wa fana ka dimaraka.Haeba tatellano le dikgokahano di nepahala hape, qalella ho fana ka dimaraka.
9. **Dikgutsufatso tse sa tsejweng**  
Amohela haeba e hlalositse pele. Haeba e sa hlaloswa, o se ke wa fana ka dimaraka ka kgutsufatso e sa tsejweng, empa fana ka dimaraka karolong e setseng haeba e nepahetse.
10. **Dinomoro tse fosahetseng**  
Haeba karabo e dumellana le tatellano e nepahetseng ya dipotso, empa ho fanwe ka nomoro e fosahetseng, se ke wa amohela.
11. **Haeba puo e sebedisitsweng e fetola moelelo o rerilweng**  
Se ke wa amohela.
12. **Diphoso tsa mopeleto**  
Haeba e tsebahala, amohela karabo, ha feela e sa bolele ho hong ho Disaense tsa Bophelo kapa haeba e sa tsamaellane le maemo.
13. **Haeba mabitso a tlwaelehileng a fanwe ho theminoloji (mantswe)**  
Amohela, ha feela e amohetswe kopanong ya naha ya dipuisano ka tataiso ya ho tshwaya.
14. **Haeba ho botsitswe tlhaku feela, empa ho fanwe ka lebitso feela (le ka tsela e fapaneng)** Se ke wa fana ka dimaraka.

15. **Haeba diyuniti di sa fanwa ho ditekanyo**  
Baithuti ba tla lahlehelwa ke dimaraka. Tataiso ya ho tshwaya e tla fana ka matshwao bakeng sa di-yuniti ka thoko.
16. **Ela hloko kutlwisiso ya karabo, e ka bewang ka tsela e fapaneng**
17. **Sehlooho**  
Dipapiso tsohle (didayakeramo, dikerafo, di theibole jj) di tlameha ho ba le Sehlooho
18. **Ho fetolela puong ya dipuo tsa semmuso (dipolelo le dikhopolo)**  
Lentswe le le leng kapa a mabedi a hlahang puwo efe kapa efe ya semmuso ntle le puwo ya tekolo ya moithuti e sebelisitsweng haholo ho dikarabo tsa hae a lokela ho amohelwa, haeba a nepahetse. Motshwai ya tsebahalang ka puo ya semmuso o le lokela ho botswa. Sena se sebetsa lipuwong tsohle tsa semmuso.

**KAROLO YA A****POTSO YA 1**

- 1.1 1.1.1 A ✓✓  
 1.1.2 C ✓✓  
 1.1.3 B ✓✓  
 1.1.4 C ✓✓  
 1.1.5 C ✓✓  
 1.1.6 A ✓✓  
 1.1.7 A ✓✓  
 1.1.8 D ✓✓  
 1.1.9 A ✓✓  
 1.1.10 D ✓✓ (10 x 2) (20)
- 1.2 1.2.1 Tjhaisema/ Khaisema ✓/ Tjhaisemata/ Khaisemata  
 1.2.2 Jene ✓  
 1.2.3 Inthafaese ✓  
 1.2.4 Mayithokhondriale DNA ✓  
 1.2.5 DNA phorofaele ✓  
 1.2.6 Phantjhuweyithete ekhwilibriyamo ✓  
 1.2.7 Phophuleishene ✓  
 1.2.8 (Biyilojikhale) evolushene ✓ (8 x 1) (8)
- 1.3 1.3.1 A feela ✓✓  
 1.3.2 B feela ✓✓  
 1.3.3 B feela ✓✓ (3 x 2) (6)
- 1.4 1.4.1 4 ✓ (1)  
 1.4.2 (a) Mona ase boalbino ✓ (1)  
 (b) nn ✓✓ (2)  
 (c) Nn ✓✓ (2)  
 1.4.3 75 ✓✓% (2)
- 1.5 1.5.1 Heliks ✓ (1)  
 1.5.2 (a) Dioksiraebese ✓ (1)  
 (b) Adenine ✓ (1)  
 (c) Haederojene ✓ bondi (1)  
 1.5.3 • Dabole seterended ✓  
 • Ena le thymine ✓ e seng uracil  
 • Para ya dinaetrerojenase baesese ✓ (Efe le efe 2 x 1) (2)  
**(Tshwaya pele tse PEDI feela)**  
 1.5.4 Nyutleyase ✓  
 Mayithochondirione ✓  
**(Tshwaya pele tse PEDI feela)** (2)

**KAKARETSO YA KAROLO A: 50**

**POTSO YA 2**

2.1 2.1.1 GGG - CCA- AGU ✓✓ (2)

2.1.2 Glycine ✓ - Proline ✓ - Serine ✓ (3)

2.1.3

- Dikhoudone etla tshintsha ho UGG ✓
- Anthikhoudone le ACC ✓
- Tla tlisa Tryptophan ✓
- Ho ena le hoo Glycine ✓
- tatellano ya di-amino asidi e tla fetoha ✓ / protheine e fapaneng e tla theha (Leha e le dife tse 4 x 1) (4)

2.1.4

- tRNA ka ngwe e na le amino asidi e itseng ✓
- ho khoudone e ho mRNA ✓ / raebosomo (2)

2.1.5	<b>DNA Repolekheishene</b>	<b>Transkripshene</b>
	Ho sebediswa diseterende tse pedi tsa DNA e le thempoleiti ✓	One DNA strand is used as template ✓
	Dinyutleyothaethi tsa DNA tse lokoleheleng diakopanya ✓ ho DNA thempoleiti	Free RNA nucleotides join ✓ to DNA template
	DNA ka o fela e a photholla	Karolo ya DNA ya photholla
	A para le T	A para le U

**Tshwaya pele tse PEDI feela** Theibole ✓  
(Leha e le dife tse 2 x 2 + 1) (5)

2.2 2.2.1 Palo le ponahalo/mofuta wa dikoromosomo seleng ya ntho e phelang ✓✓ (2)

2.2.2 8 ✓ (1)

2.2.3

- Batshehadi ba XX ✓
- le ba batona ba XY ✓ (2)

2.3 2.3.1

- Ha dintho tse phelang tse pedi tse homozaekase tse nang le ditshobotsi tse fapaneng di koroswa ✓
- Dintho tlohle tse moloko wa F1 di tla bontsha dominante tereit ✓

**KAPA**

- Motho/ dinthotse le heterozaekase bakeng sa tshobotsi e itseng ✓
- di tla ba le tshobotsi e hlahelletseng jwalo ka fenothaepe ✓  
(Leha e le efe 1 x 2) (2)

**(Leha e le dife tse 5 + \*2 T Tlamehile)**

Mayosise le Fethiliseishene ✓ (Leha e le dife tse 5 + \*2 Tlamehile)

(7)

2.4      2.4.1    Khontinyuwase ✓ vareashene (1)

2.4.2 Ho nale difenothaepe bo hareng ✓✓/bolelele (2)

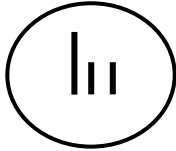
2.4.3

- Bahlahisi ba dimela/batho ba khetha ✓ tshobotsi le
- eseng ho khetha tlhaho ✓ sebopeho
- Ba khetha ditshobotsi tseo ba di ratang ✓/ batho
- mme ha e na thuso ho phela ✓ (Leha e le dife tse 2 x 2) (4)

2.4.4 Dominense e sa fellang ✓ (1)

2.4.5 Ho jwalo ✓

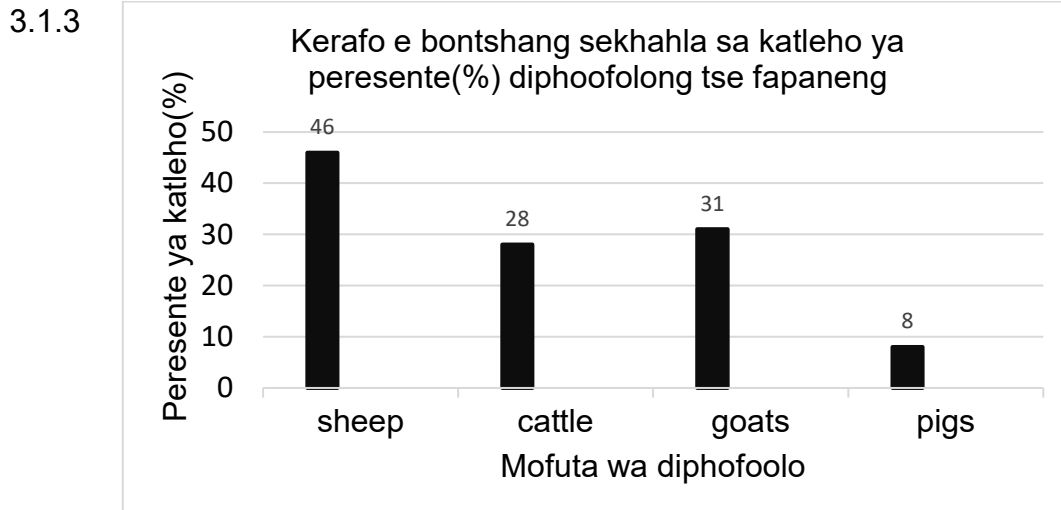
- Dipalesa tsa lamunu di na le allele e le nngwe e khubelu✓ / ke heterozaekase
- Haeba dimela ka bobedi di feta allele e le nngwe e khubelu ✓ pewu e tla ba khubelu (3)

- 2.5 2.5.1 Anafeise 1 ✓ (1)
- 2.5.2 Koromosomale ✓ mutheishene (1)
- 2.5.3
- Gamete e nang le khopi e eketsehileng ya koromosomo 21 ✓ e tla etsahala
  - Haeba gamete ena e kopana le gamete e tlwaelehileng ✓ / gamete ena le dikoromosomo tse 23
  - Zaegote e na le dikoromosomo tse 47 ✓ / kopi e eketsehileng ya koromosomo 21 e tla etswa
  - Sena se tla lebisa ho Down syndrome ✓ (4)
- 2.5.4
- 
- Ho entswe dikoromosomo tse tharo tse khwele e le nngwe ✓
  - Boholo bo nepahetseng ba dikoromosomo tse tharo ✓ (2)
- 2.5.5
- Sepeme ✓ sele ✓ (1)
- [50]

### POSTSO YA 3

3.1 3.1.1 Diembiriyo tse ngata a di ile tsa fetisetwa ho bo mma asarogeite ✓/ ho ile ha sebediswa sampuli e kholo ya diembiriyo. (1)

3.1.2 Sekhahla sa katleho ya tlelouning ✓ (1)



#### Tataiso bakeng sa tlhahlobo ya kerafo

DITEKANYETSO	TLHALOSO	MARAKA
Mofuta o nepahetseng wa kerafo (T)	Kerafo ya dibar(bazi/bara/boloko)	1
Sehloho sa kerafo (C)	Divariebole tse pedi di kenyeleditswe	1
Dileibole tsa dieksise (L)	$x$ - le $y$ -eksise di leibolewe ka ho nepahetsing	1
Sekala sa $x$ - le $y$ -eksise(S)	Bopara ba dibazi (bars) bo tshwanang ba $x$ - le - sekala se nepahetsing sa $y$ - eksise	1
Ho polota dintlha(P)	1 ho tse 3 dibara (bazi/bars/ boloko) dipolotiwe ka ho nepahetsing Ka o feela di bara (bazi/ boloko) tse 4 dipolotiwe ka ho nepahetsing	1 2

(6)

3.1.4 - Hlahisa dintho tse phelang tse nang le ditshobotsi tse lakatsehang ✓  
mohlala; bophelo bo botle; ponahalo;

e nang le phepo; yilide; pophelo ba sethala(shelefu layefu); etc.

- Khoneseveishene ya mofuta e kotsing ✓

- Ho etsa di thishu/ditho tsa mmele bakeng sa ho fetisetwa (transepolanta) ✓

- Repoleisa dithishu tse senyehileng ✓

- Thibela mafu a lefutso ✓

- Ntlafatsa phepelo/boleng ba dijo ✓

**Tshwaya pele ele NNGWE feela** (Leha e le efe tse 1 x 1) (1)

3.1.5 Ditsenyehelo tsa tlelouning di holdimo haholo ✓/ di bitsa R300 000

Nama e ne e tla tura haholo ✓

Sekhahla sa katleho se tlase ✓/ sekhahla sa katleho ke 28%

Ho ne ho tla nka nako e telele/matsapa ho hlahisa kgomo ka nngwe. ✓ (4)



- 3.2 3.2.1 • Ditlou dija jwang ha ngata, lekgapetla, ditholwana, lekgapetla la difate le metso ya diledyumo. ✓ (1)
- 3.2.2  $\frac{33}{100}$  ✓ x 91 ✓ = 30 ✓ tlou e tsehadi (3)
- 3.2.3 • Ho na le phapang e kholo hara palo ya ditlou ✓  
 • Tse deng di ne le na le manaka, tse deng disenang manaka ✓  
 • Ha ho ne ho ena le keketseho ya ho phowutsha ✓  
 • Ditlou tse seng na manaka, phila ✓  
 • Ha ditlou di na le manaka, di ile tsa bolawa ✓  
 • Ditlou tse di ele tsa phila, tsa tswala ✓  
 • tsa fetisa allele ya tshobotsi e ntle ho bana ( ofosepiring) ✓  
 • Ka hona moloko o latelang o bile le karolo e phahameng ya di individyuwale tse nang manaka ✓ ( Leha e le dife tse 5 x 1) (5)
- 3.2.4 • Ho tla ba le diledyumo le difate tse ngata ✓  
 • Le jwang bo fokolang ✓  
 • Kaha jwale ditlou di ja jwang bo bongata ✓/diledyumo tse nyane/ lekhapetla le fokolang  
 (Leha e le dife tse 2 x 1) (2)
- 3.3 3.3.1 • E progenathase ha holo ✓  
 • Keraniamo e leng nyane nyane ✓  
 • E-ba le mehlahare e meholwanyane ✓  
 • Ho ba le mohlhahare o leng wa U haholo ✓  
 • E ba le di porominente borow rijese  
 (Leha e le dife tse 2 x 1) (2)
- (Tshwaya pele tse PEDI feela)**
- 3.3.2 • Ba ne ba ja dijo tse tala haholo ✓  
 • ka hona, ho ba le meno a maholo ✓ ho tabola le ho hahola (2 x 1) (2)
- 3.3.3 Lesoba botlaseng ba lehata moo mokokotlo o kenang teng ✓ (1)
- 3.3.4 • Ho *Homo sapiens* forameni magenamo e boemong bo ka pele ✓  
 • Ka hona, di leng bayiphedale ✓  
 • Ho dikorilla forameni magenamo boemong ba morao ✓  
 • Ka hona, di li khwaderaphele ✓/diseng bayiphedale (4)
- 3.3.5 • *Homo sapiens* bale bko bobo holo ✓  
 • ka hona, bo bohlale ho feta ✓ (2)

- 3.4
- *Moholwane wa fosile Ardipithecus* difumanehile Afrika FEELA ✓
  - *Australopithecus* fosile difumanehile Afrika FEELA ✓
  - Difosile tsa *Homo habilis* difumanehile Afrika FEELA ✓
  - *Moholwane wa fosile wa Homo erectus* difumanehile in Afrika ✓
  - *Moholwane wa fosile wa Homo sapiens* difumanehile Afrika ✓
  - ha difosile tse dinyanyane tsa *Homo erectus* / *Homo sapiens* difumanehile ho dikarolo tseding tsa lefatse ✓ (Leha e le efe tse 5 x 1) (5)
- 3.5
- 3.5.1 Failojenethiki tere ✓ (1)
- 3.5.2 5 ✓ (1)
- 3.5.3 1 mya ✓ (1)
- 3.5.4 *Australopithecus africanus* ✓ (1)
- 3.5.5
- • Ha ho na mola o otlohileng ho tloha moo *Homo erectus* ho *Homo sapiens* ✓ hobane
  - *Homo erectus* le *Homo sapiens* ka bobedi di bile teng ho tswa ho moholo-holo a le mong ✓ (2)
- 3.5.6 *Homo neanderthalensis* ✓ (1)
- 3.5.7 Prof. Lee Burger ✓ (1)
- 3.5.8 Sterkfontein Caves ✓/Cradle of Humankind Taung ✓ (2)
- [50]

**KAKARETSO YA KAROLO B: 100**  
**KAKARETSO E FELLETSING: 150**