



Province of the  
**EASTERN CAPE**  
EDUCATION



**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**SEPTEMBER 2022**

**LIFE SCIENCES P2  
ISIKHOKELO SOKUMAKISHA**

**AMANQAKU: 150**

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Esi sikhokelo sokumakisha sinamaphepha ali 10.

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## IIPRINCIPLIZI EZIMAYELANA NOKUMAKISHA ILIFE SCIENCES

1. **Ukuba kunikwe iimpendulo ezingaphezu kwamanqaku anikiweyo**  
Yeka ukumakisha wakufika kumanqaku aphezulu ubhale umgca owavy no 'max' kwimargin esekunene.
  2. **Xa, umzekelo, zintathu izizathu ezifunwayo kube kunikwe ezintlanu**
  3. Makisha ezokuqala ezintathu noba zichanekile okanye azichanekanga.
  4. **Xa yonke iprocess inikwe apho bekufunwa isiqingatha**  
Yifunde yonke ucredithe iindawo ezamkelekileyo.
  5. **Xa kubuzwe icomparison, kodwa kunikwe inkcaza**
  6. Yamkele ukuba iidifference/nesimilarity zicazile.
  7. **Xa bekufunwa itabulation, kodwa kunikwe umhlathi**  
Abafundi baya kuphulukana namanqaku ngokungatabulathi.
  8. **Xa iidiagram ezihamba neannotation zinikwe endaweni ekufunwa kuyo inkcaza**
  9. Abafundi bayakuphulukana namanqaku.
  10. **Xa iiflow zinikwe endaweni yedescription**  
Abafundi baya kuphulukana namanqaku.
  11. **Xa isequene ivutyiwe nelink zingenzi ngqiqo**
  12. Apho isequene ne link zichanekile, creditha. Xa isequene and ne link, zingachanekanga, ungacredithi. Xa isequene ne link ziphinde zachaneka, phinda ucredithe.
  13. **Iabbreviation ezingekho mthethweni**  
Zamkele ukuba ziqale zachazwa kwimpendulo. Ukuba azichazwanga, ungayicredithi abbreviation engaziwayo, kodwa yicredithe yonke enye indawo yempendulo ukuba ichanekile.
  14. **Iwrong numbering**  
Ukuba iimpendulo zilandelelana ngokufanelekileyo ngokwemibuzo, kodwa kunikwe inombolo ewrong, yamkela.
- Xa ulwimi olusetyenzisiweyo lutshintsha inthetho ekubhekiswe kuyo**  
Ungamkeli.
- Ispelling error**  
Ukuba impendulo isondele kweyaziwayo, yamkele, xa ingathethi enye into kwiLife Sciences okanye ingaphumanga emxholweni.
- Xa amagama acommon enikwe endaweni yeterminology**  
Wamkele, xa amkelekile kwintatho discussion meeting.
- Xa kubuzwe unobumba yedwa, kodwa kunikwe igama (okanye iverse)**  
Ungacredithi.

15. **Xa iiunit zinganikwanga kwimeasurement**  
Abafundi bayakuphulukana namanqaku. Imemorandum iyakubanamanqaku asecani abelwa iiunit.
16. **Yibanenkathalo ngempendulo ezinengqiqo, ezisenokubekwa ngendlela eyahlukileyo.**
17. **Isihloko**  
Zonke iillustration (iidiagram, iigraph, iitable, njalonjalo) mazibenesihloko.
18. **Icode-switching yolwimi oluvumelekileyo (iiterm and iiconcept)**  
Igama elinye okanye amabini avela ngolwimi oluvumelekileyo lungeyilulo olona lusetyenziswe kwimpendulo zovavanyo lomfundi malicredithwe, xa lamkelekile. Imarker elwaziyo ulwimi olo mayicelwe. Ibhekisa kuzo zonke iilwimi ezivumelekileyo.

## ICANDELO A

## UMBUZO1

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	Chiasma ✓/ chiasmata		
	1.2.2	Gene ✓		
	1.2.3	Interphase ✓		
	1.2.4	Mitochondrial DNA ✓		
	1.2.5	DNA profile ✓		
	1.2.6	Punctuated equilibrium ✓		
	1.2.7	Population ✓		
	1.2.8	(Biological) evolution ✓	(8 x 1)	(8)
1.3	1.3.1	A qha ✓✓		
	1.3.2	B qha ✓✓		
	1.3.3	B qha ✓✓	(3 x 2)	(6)
1.4	1.4.1	4 ✓		(1)
	1.4.2	(a) Indoda engena albinizim ✓		(1)
		(b) nn ✓✓		(2)
		(c) Nn ✓✓		(2)
	1.4.3	75 ✓✓%		(2)
1.5	1.5.1	Helix ✓		(1)
	1.5.2	(a) Deoxyribose ✓		(1)
		(b) Adenine ✓		(1)
		(c) Hydrogen ✓ bond		(1)
	1.5.3	<ul style="list-style-type: none"> <li>• Double stranded ✓</li> <li>• ine thymine ✓ hayi iuracil</li> <li>• linitrogenous base zihamba ngee pairs ✓</li> </ul> <b>(Mark first TWO only)</b>	(Nayiphi 2 x 1)	(2)
	1.5.4	Nucleus/nyukliyas ✓ Mitochondrion/Mayithokhondrionu ✓ <b>(Mark first TWO only)</b>		(2)

EWONKE AMANQAKU ECANDELO A: 50

**QUESTION 2**

2.1 2.1.1 GGG - CCA- AGU ✓✓ (2)

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

2.1.3

- Ikhawudon iya kutshintsha ibe ngu-UGG ✓
- I-anticodon ene-ACC ✓
- iza kuzisa iTryptophan ✓
- endaweni yeGlycine ✓
- Ulandelelwano lwee-amino acids luyakutshintsha ✓ /iprotheyini eyahlukileyo iyakwenzeka ✓ (Nayiphi 4 x 1) (4)

2.1.4

- I-tRNA nganye iphethe iamino acid ethile ✓
- kwicodon ekwi-mRNA ✓/ iribosome (2)

2.1.5

IDNA Replikheyishini	Itranskripshini
IiDNA strends ezimbini zisetyenziswa njenge thempleyithi ✓	IDNA strendi enye isetywnziswa njenge thempleyithi ✓
Iifree DNA nyukliothads ziyajoyina ✓ Kwi DNA thempleyithi	Iifree RNA nyukliothads zijoyina ✓ kwi DNA thempleyithi
Whole DNA unwindsYonke I DNA iyawululela	Indawana ye DNA iyawululeka
uA uperisha no T	uA uperisha no U

Table ✓

**Markisha ezokuqalaeziMBINI qha** (Nayiphi 2 x 2 + 1) (5)

2.2 2.2.1 Inamba nembonakalo/uhlobo lweecchromosomes kwioganizim ✓✓ (2)

2.2.2 8 ✓ (1)

2.2.3

- limazi ngu XX ✓
- linkunzi ngu XY ✓ (2)

2.3 2.3.1

- Xa ii-homozygous oganizim ezine contrasting characteristics zikhrosiwe ✓
- zonke ii-individuals ze F1 generation zizakubonisa idominant characteristic ✓

**OKANYE**

- Iindividual eheterozygous kwicharacteristic ethile ✓
- Iyakuba nedominant trait njengephenotype ✓ (Nayiphi 1 x 2) (2)

2.3.2	<b>P<sub>1</sub></b>	Phenotype	Imazi emehlo abomvu	x	Inkunzi emehlo amhlophe ✓
		Genotype	$X^R X^r$ ✓	x	$X^r Y$ ✓
	Meiosis	<b>G/gametes</b>	$X^R, X^r$	x	$X^r, Y$ ✓
	Fertilisation	<b>F<sub>1</sub></b>	Genotype	$X^R X^r ; X^R Y ; X^r X^r ; X^r Y$ ✓*	
		Phenotype	1 imazi emehlo abomvu : 1 inkunzi emehlo abomvu : 1 imazi emehlo amhlophe: 1 inkunzi emehlo amhlophe ✓*		

P<sub>1</sub> and F<sub>1</sub> ✓

Imeyosisi ne fertilisation ✓ (Nawaphi ayi5 + \*2 unyanzeelekile)

### OKANYE

<b>P<sub>1</sub></b>	Phenotype	Imazi emehlo abomvu	x	Inkunzi emehlo amhlophe ✓
	Genotype	$X^R X^r$ ✓	x	$X^r Y$ ✓
Meiosis	<b>G/gametes</b>	$X^R, X^r$	x	$X^r, Y$ ✓

Fertilisation  
**F<sub>1</sub>**

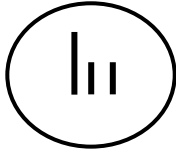
Gametes	$X^r$	<b>Y</b>
<b><math>X^R</math></b>	$X^R X^r$	$X^R Y$
<b><math>X^r</math></b>	$X^r X^r$	$X^r Y$
Correct genotypes ✓*		

Phenotype 1 Imazi emehlo abomvu: 1 inkunzi emehlo abomvu: 1 imazi emehlo amhlophe: 1 inkunzi emehlo amhlophe ✓\*

P<sub>1</sub> and F<sub>1</sub> ✓

Imeyosisi ne fertilisation ✓ (Nawaphi ayi5 + \*2 Anyanzekekileyo) (7)

- 2.4 2.4.1 Yicontinuous ✓ variation (1)
- 2.4.2 Kukho irange yeintermediate phenotype ✓✓/iiheight (2)
- 2.4.3
- Iplant breeder/abantu bakhetha ✓ icharacteristic
  - hayi inature selecting ✓ characteristic
  - Bakhetha ezo characteristic zifunekayo kubo ✓/abantu
  - engenaluncedo kwisurvival ✓ (Nayiphi 2 x 2) (4)
- 2.4.4 Incomplete ✓ dominance (1)
- 2.4.5 Ewe ✓
- Iintyatyambo eziorange zineallele enye ebomvu ✓/ ziheterozygous
  - Ukuba zombini izityalo zigqithisa iallele enye ebomvu ✓ ii offspring zakubabomvu (3)

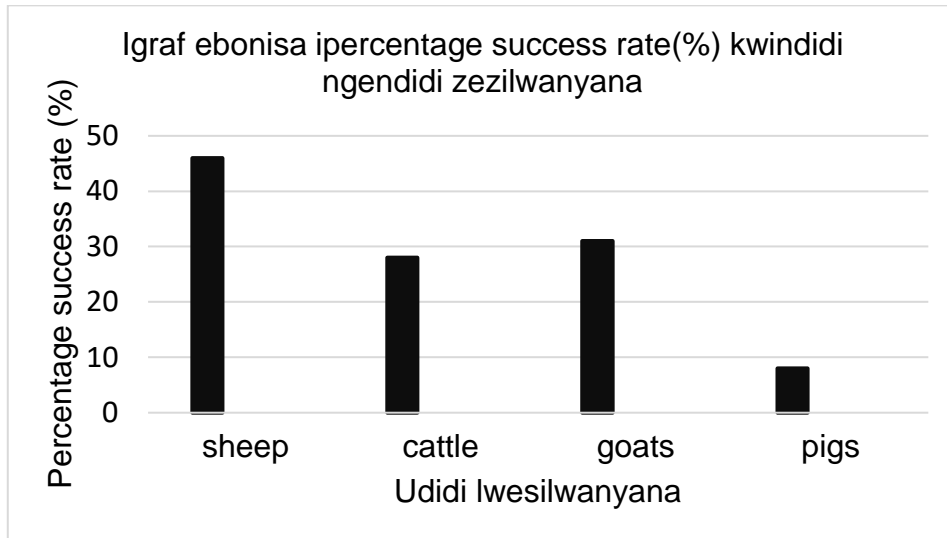
- 2.5 2.5.1 Anaphase 1 ✓ (1)
- 2.5.2 Yikromosomal ✓ mutation (1)
- 2.5.3
- Igamete ene kopi yechromosome 21 eyongezelelekileyo ✓ iyakwenzeka
  - Ukuba le gamete ifyuza nenormal gamete ✓ / igamete enekromosome eziyi23
  - Izygote enekromosome eziyi47 ✓ / ikopi yechromosome 21 eyongezelelekileyo iyakwenzeka
  - Le nto iyakukhokelela kwiDown syndrome ✓ (4)
- 2.5.4
- 
- Isingle stranded chromosome ezintathu ezizotyweyo ✓
  - Echanekileyo isize yekromosome ezintathu ✓ (2)
- 2.5.5
- Sperm ✓ cells (1)
- [50]

## QUESTION 3

3.1 3.1.1 Iembryo ezininzi zatshintshelwa kwisurrogate mothers ✓/ isample size enkulu ye-embryos yasetyenziswa. (1)

3.1.2 Isuccess rate yecloning ✓ (1)

3.1.3



Isikhokelo sokuvavanya igraf

CRITERIA	ELABORATION	MARK
Correct type of graph (T)	Bar graph	1
Caption of Graph (C)	Zombini iivariables zifakiwe	1
Axes labels (L)	<i>ix-</i> ne <i>y-axis</i> zi leyibhelishwe chanekileyo	1
iScale se <i>x-</i> ne <i>y-axis</i>	Bunye ubukhulu beebars be <i>x-axis</i> ne -sichanekileyo iscale se <i>y-axis</i>	1
Uploto lwee bars	1– 3 bars ziplotwe chanekileyo zonke 4 bars ziplotwe chanekileyo	1 2

(6)

3.1.4 - Zenza iiorganism ezine traits ezinqwenelekayo ✓ e.g. imbonakalo; ukuphila nutritious; imveliso; shelf-life; etc.  
- Iconservation yethreatened species ✓  
- ukwenza itissue/organs zetransplant ✓  
- ukubuyisela itissue eyonakeleyo ✓  
- Zikhusela iigenetic disease ✓  
- Iphucula ifood supply/iquality ✓

**Makisha eyokuqala qha.**

(Nayiphi 1 x 1) (1)

3.1.5 Ixabiso le cloning liphezulu kakhulu ✓/ xabisa R300 000  
Inyama iyakuba duru ✓

Izinga lempumelelo lisezantsi kakhulu ✓/ izinga lempumelelo ngu 28%  
Iyakuthatha ixesha elide/umzamo wokwenza inkomo nganye. ✓ (4)



- 3.2 3.2.1 • lindlovu ngokuqhelekileyo zitya ingca, amagqabi, ifruit, amaxolo emithi neengcambu ze legume. ✓ (1)
- 3.2.2  $\frac{33}{100} \checkmark \times 91 \checkmark = 30 \checkmark$  iimazi zendlovu (3)
- 3.2.3 • Kukho I great deal of variation kwipopulation yeendlovu ✓  
 • Ezinye zinambamba, kwaye ezinye azinawo ✓  
 • Xa kwakukho ulonyulo kwi poaching ✓  
 • lindlovu ezingenamabamba, zaphila ✓  
 • ngexa ezinambamba, zabalawayo ✓  
 • lindlovu ezaphilayo, zazala ✓  
 • Zagqithisela iallele yefavourable characteristic kwioffspring zazo ✓  
 • generation elandelayo yaneproportion yee individual ezingenamabamba. ✓ (Nawaphi 5 x 1) (5)
- 3.2.4 • Ziyakubaninzi iilegumes nemithi ✓  
 • nengca embalwa ✓  
 • njengoko iindlovu ngoku zisitya ingca eninzi ✓/ iilegumes ezimbalwa/ amaxolo ambalwa (Nawaphi 2 x 1) (2)
- 3.3 3.3.1 • iprognathous kakhulu ✓  
 • Zine cranium encinci ✓  
 • Zine jaw ezinkulu ✓  
 • Zine U-shape jaw ezininzi ✓  
 • Zine prominent brow ridges ✓ (Nawaphi 2 x 1) (2)  
**(Makisha eziMBINI zokuqala)**
- 3.3.2 • Zitya ukutya okungaphekwanga okuninzi ✓  
 • Ngoko ke, zinamazinyo amakhulu ✓ okukrazula. (2 x 1) (2)
- 3.3.3 Umngxunya okwibase yeskull apho ispine singena khona. ✓ (1)
- 3.3.4 • Kwi *Homo sapiens* iforamen magnum ikwiforward position ✓  
 • Ngoko ke, zi bipedal ✓  
 • Kwi gorilla iforamen magnum ikwibackward position ✓  
 • Ngoko ke, ziquadrupedal ✓/hayibipedal (4)
- 3.3.5 • Ii *Homo sapiens* zinelarger brain ✓  
 • Ngoko ke, zikrelekrele kakhulu ✓ (2)

- 3.4
- *IOldest fossils yeArdipithecus yafunyanwa e Africa QHA ✓*
  - *IAustralopithecus fossils yafunyanwa eAfrica QHA ✓*
  - *ifossils yeHomo habilis yafunyanwa eAfrica QHA ✓*
  - *iOldest fossils yeHomo yafunyanwa eAfrica ✓*
  - *iOldest fossils yeHomo sapiens yafunyanwa eAfrica ✓*
  - *ngelixa iifossils ezincinci ze Homo erectus / Homo sapiens zafunyanwa kwezinye iindawo zehlabathi ✓* (Nawaphi 5 x 1) (5)
- 3.5
- 3.5.1 Yiphylogenetic tree ✓ (1)
- 3.5.2 5 ✓ (1)
- 3.5.3 1 mya ✓ (1)
- 3.5.4 *Australopithecus africanus ✓* (1)
- 3.5.5
- *Akukho direct line esuka kwiHomo erectus eya kwiHomo sapiens ✓ kuba*
  - *iHomo erectus ne Homo sapiens zimbini zaevolva kwi common ancestor ✓* (2)
- 3.5.6 *Yi homo neanderthalensis ✓* (1)
- 3.5.7 Ngu Prof. Lee Burger ✓ (1)
- 3.5.8 *ESterkfontein Caves ✓/KwiCradle of Humankind Taung ✓* (2)
- [50]**

**AMANQAKU ECANDELO B: 100**  
**AMANQAKU EWONKE: 150**