basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

LIFE SCIENCES P2

MAY/JUNE 2024

LIFE SCIENCES: Paper 2

10832E

MARKS: 150

TIME: 2½ hours

X05

This question paper consists of 17 pages.

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INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in the ANSWER BOOK.
3. Start the answers to EACH question at the top of a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Present your answers according to the instructions of each question.
6. Do ALL drawings in pencil and label them in blue or black ink.
7. Draw diagrams, tables or flow charts only when asked to do so.
8. The diagrams in this question paper are NOT necessarily drawn to scale.
9. Do NOT use graph paper.
10. You must use a non-programmable calculator, protractor and a compass, where necessary.
11. Write neatly and legibly.

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SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question numbers (1.1.1 to 1.1.9) in the ANSWER BOOK, e.g. 1.1.10 D.

1.1.1 Which female scientist took X-rays of the DNA molecule and concluded that DNA is helix-shaped?

A Watson
B Franklin
C Crick
D Wilkins

1.1.2 A cell with 14 chromosomes undergoes meiosis.

What is the number of chromatids in this cell at the beginning of meiosis?

A 7
B 14
C 28
D 56

1.1.3 In the inheritance of blood groups there are ...

A two phenotypes controlled by three alleles.
B three phenotypes controlled by two alleles.
C four phenotypes controlled by three alleles.
D four phenotypes controlled by two alleles.

1.1.4 The following statements relate to cell division:

(i) Crossing over occurs
(ii) Contributes to genetic variation in a population
(iii) Produces cells with a diploid number of chromosomes
(iv) Produces somatic cells only

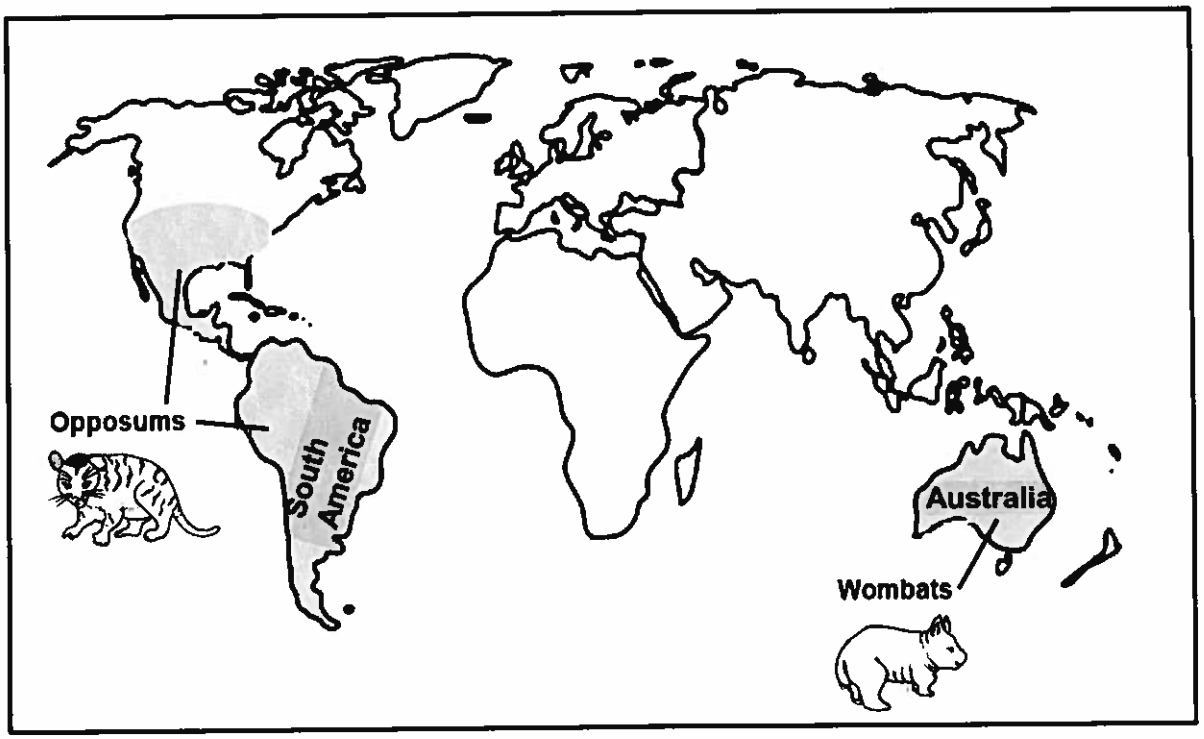
Which ONE of the following combinations of statements refer to meiosis?

A (i), (ii) and (iii) only
B (i) and (ii) only
C (ii) and (iv) only
D (ii) and (iii) only

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1.1.5 The opossums and wombats are believed to have originated from a common ancestor.

The shaded parts of the diagram below show the distribution of these species.



The type of evidence for evolution that is represented in the diagram is ...

A biogeography.
B modification by descent.
C genetics.
D cultural.

1.1.6 A plant with yellow (y) and round (R) peas is crossed with a plant with green (Y) and wrinkled (r) peas.

Which ONE of the following are the possible genotypes of the parents (P_1)?

A yyRR x YYRr
B YyRR x yyrr
C Yyrr x YYRR
D yyRR x YYrr

1.1.7 A segment of DNA contains:

- 31% of adenine in strand **1**
- 12% of cytosine in strand **2**
- 27% of guanine in strand **2**

In this segment of DNA, there will also be …

A 31% of adenine in strand **2**
B 12% of cytosine in strand **1**
C 31% of thymine in strand **2**
D 27% of cytosine in strand **2**

1.1.8 Two people each gave four descriptions about themselves.

	PERSON 1	PERSON 2
P	I can roll my tongue.	I cannot roll my tongue.
Q	I am 150 cm tall.	I am 153 cm tall.
R	I have unattached earlobes.	I have attached earlobes.
S	My blood group is A.	My blood group is AB.

Which ONE of the following combinations are examples of discontinuous variation?

A P, Q and S
B P, R and S
C Q, R and S
D P, Q, R and S

1.1.9 The phase in meiosis where chromatids are pulled towards poles is …

A anaphase I
B telophase I
C metaphase II
D anaphase II

(9 x 2) **(18)**

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1.2 Give the correct **biological term** for each of the following descriptions. Write only the term next to the question numbers (1.2.1 to 1.2.8) in the ANSWER BOOK.

1.2.1 A section of a DNA molecule that codes for a specific characteristic

1.2.2 A pattern of black bars resulting from DNA analysis

1.2.3 Evolution characterised by long periods of no change alternating with short periods of rapid change

1.2.4 The production of a genetically identical copy of an organism using biotechnology

1.2.5 Undifferentiated cells in animals that have the potential to become any type of tissue

1.2.6 A genetic disorder that results in a person who cannot distinguish between the colours red and green

1.2.7 The part of the plant where the male gametes are produced

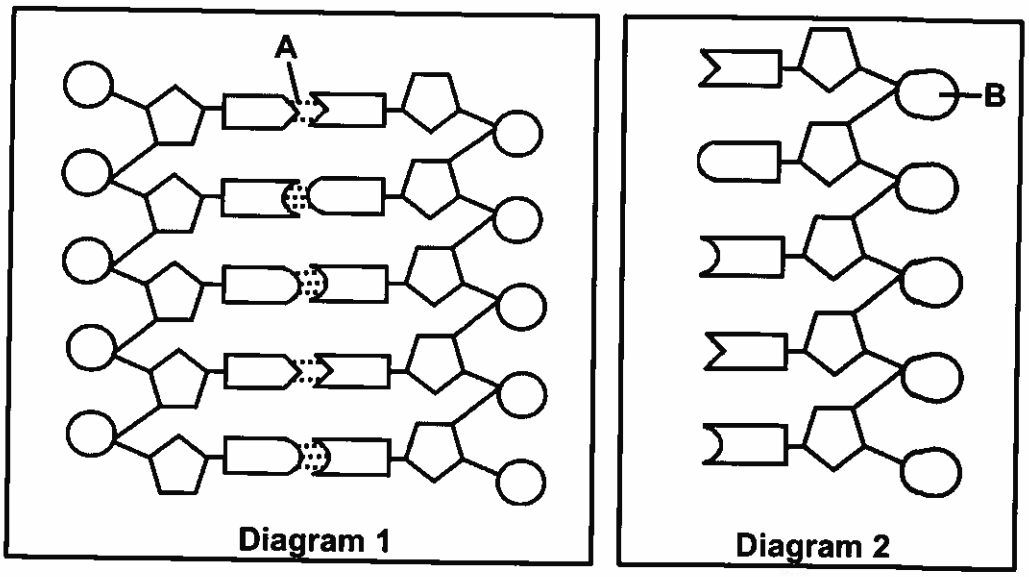
1.2.8 The structure that joins two chromatids together (8 x 1) **(8)**

1.3 Indicate whether each of the descriptions in COLUMN I apply to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B** or **none** next to the question numbers (1.3.1 to 1.3.3) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	The type of dominance in which neither of the two alleles is dominant over each other, resulting in an offspring with an intermediate phenotype	A: Complete dominance B: Co-dominance
1.3.2	The point where two chromatids overlap during crossing over	A: Chiasma B: Locus
1.3.3	The scientist who proposed the law of segregation	A: Darwin B: Lamarck

(3 x 2) **(6)**

1.4 The diagrams below represent two types of nucleic acids.



1.4.1 Identify the nucleic acid shown in diagram **1**. (1)

1.4.2 Identify:

(a) **A** (1)

(b) **B** (1)

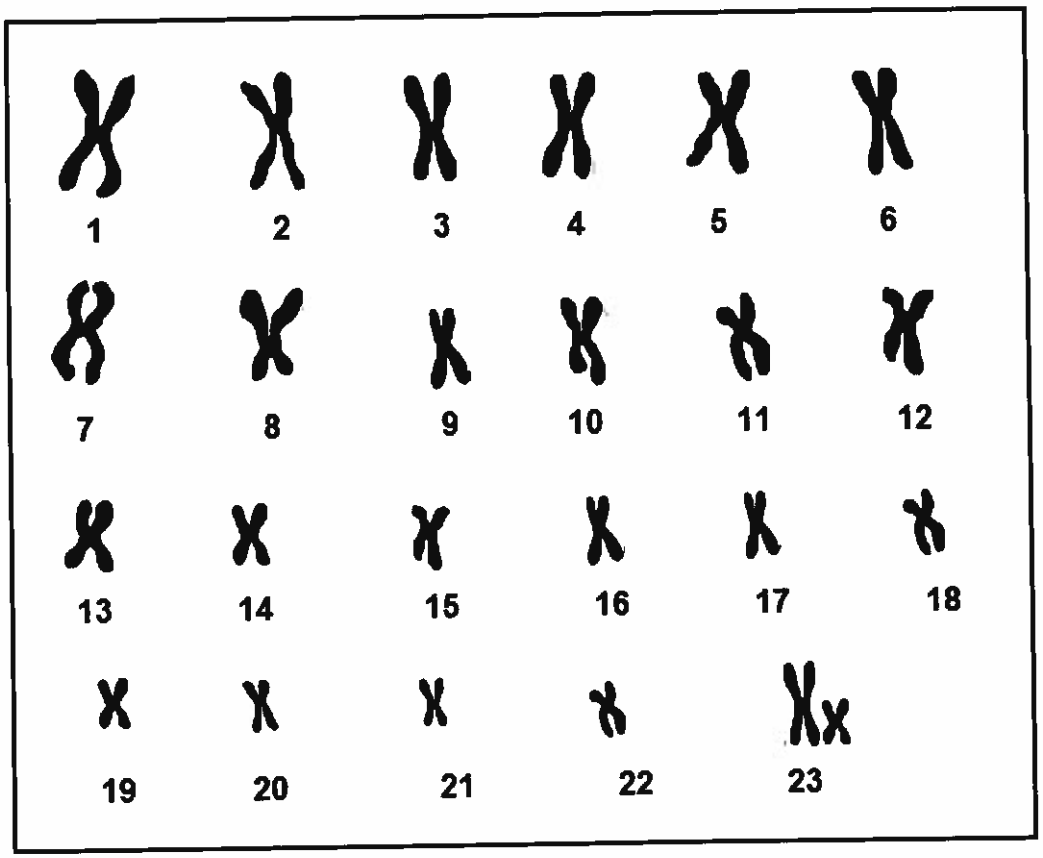
1.4.3 Name the type of sugar found in the nucleic acid represented in diagram **2**. (1)

1.4.4 Which diagram (**1** or **2**) represents a nucleic acid that is used for:

(a) Tracing of human ancestry (1)

(b) Paternity testing (1)
(6)

1.5 The diagram below shows the karyotype of a gamete of an individual.



1.5.1 Name the type of mutation that occurred during the production of this gamete. (1)

1.5.2 What type of gamete is represented in the karyotype? (1)

1.5.3 In this gamete, give the number of:

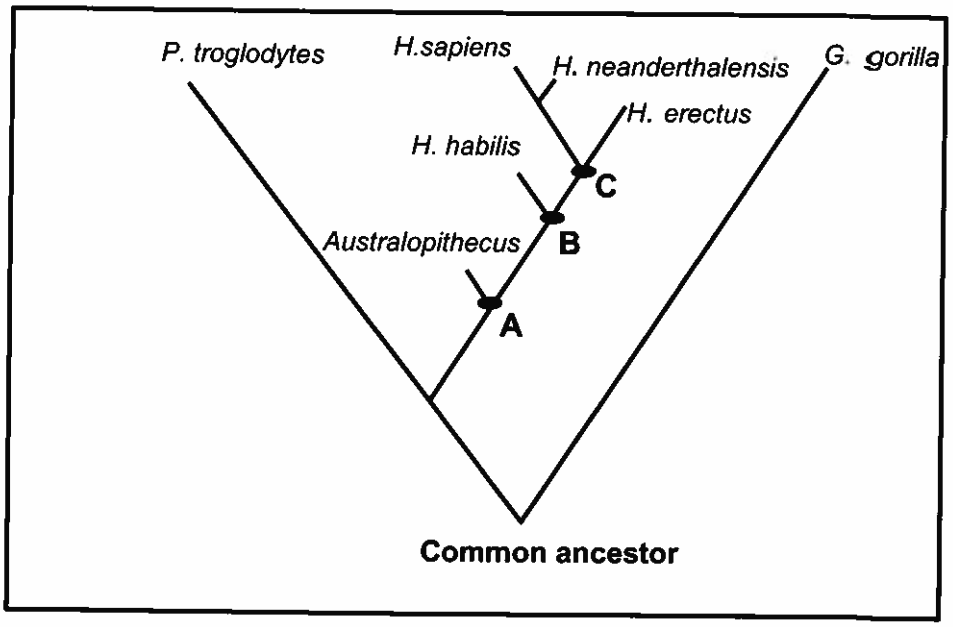
(a) Autosomes (1)

(b) Gonosomes (1)

1.5.4 This gamete fuses with a normal gamete.

Using X and Y representation, write the sex chromosomes of the offspring. (2)
(6)

1.6 The diagram below shows the evolutionary relationship between different species.



1.6.1 Identify the type of diagram shown above. (1)

1.6.2 Give the:

(a) Genus that gave rise to the *Australopithecus* at **A** (1)

(b) LETTER that represents the most recent common ancestor for both *H. sapiens* and *H. erectus* (1)

1.6.3 Name TWO species that existed at the same time as *H. erectus.* (2)

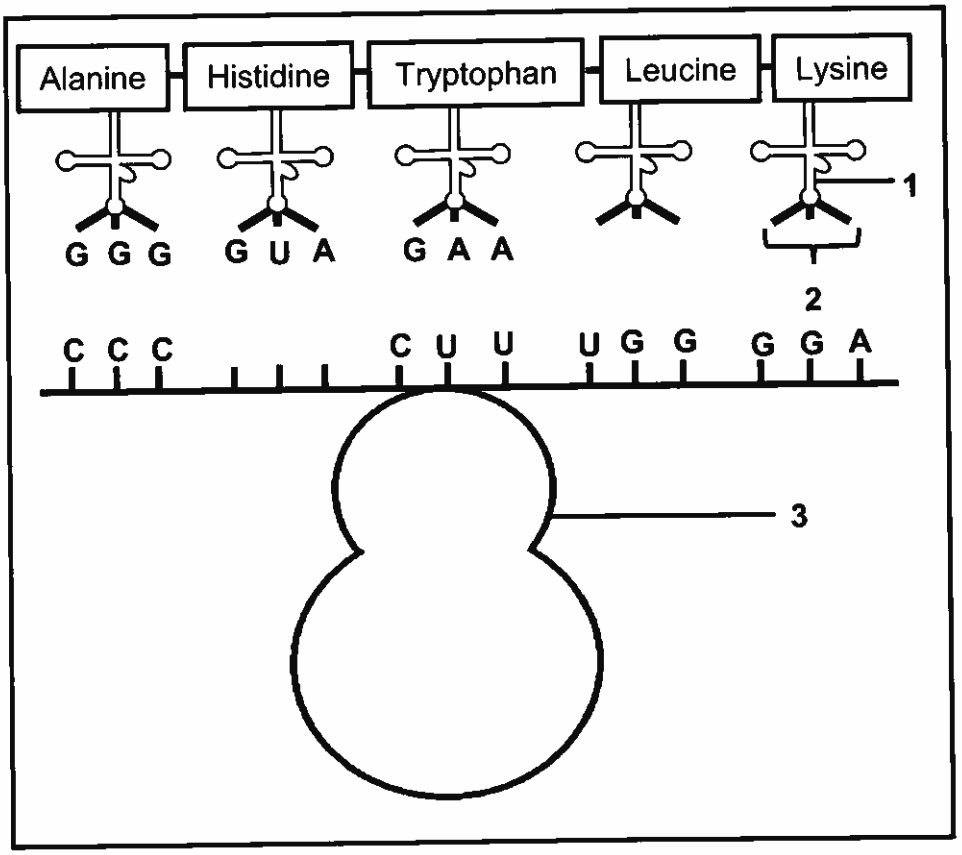
1.6.4 Give ONE example of the fossil of *Australopithecus africanus* that was found in South Africa. (1)
(6)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 The diagram below represents a stage during the synthesis of a certain protein.



2.1.1 Identify organelle **3**. (1)

2.1.2 Describe the role of molecule **1** during this stage of protein synthesis. (2)

2.1.3 Give the sequence of nitrogenous bases:

(a) At **2** (1)

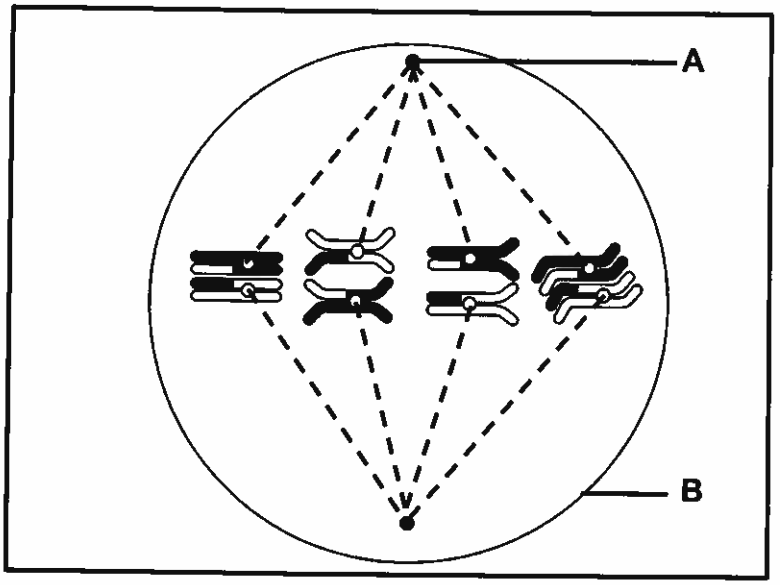
(b) On the DNA molecule that coded for histidine (2)

2.1.4 During the synthesis of the same protein, there was a change in the amino acid sequence because alanine was replaced by tryptophan.

Explain the possible reason for this. (3)
(9)

2.2 Describe *transcription*. **(6)**

2.3 The diagram below represents metaphase I of meiosis.

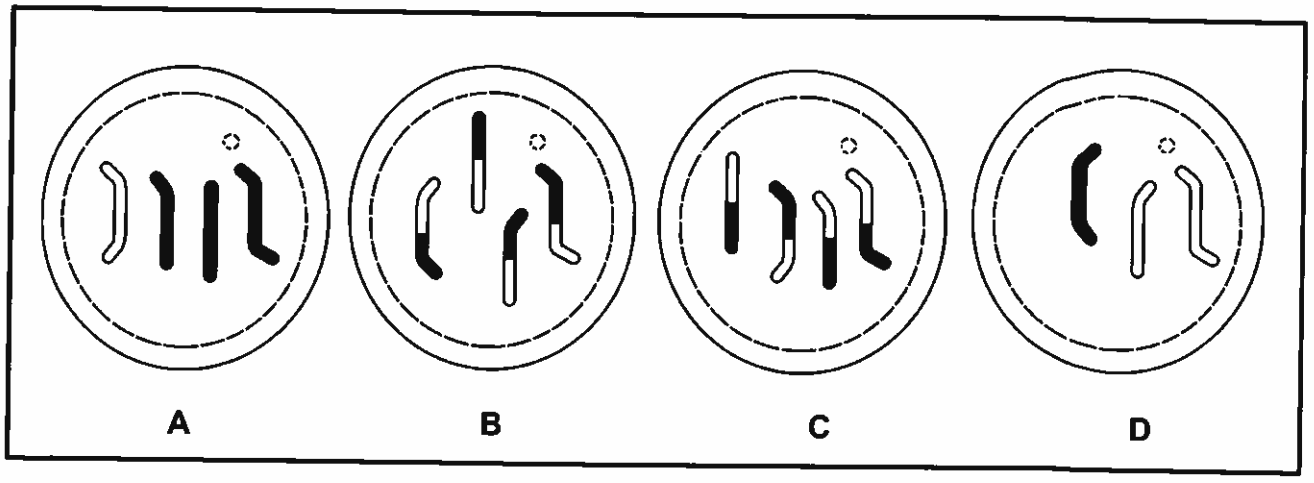


2.3.1 Identify part **B**. (1)

2.3.2 State ONE function of part **A**. (1)

2.3.3 Explain the contribution of metaphase I to natural selection. (6)

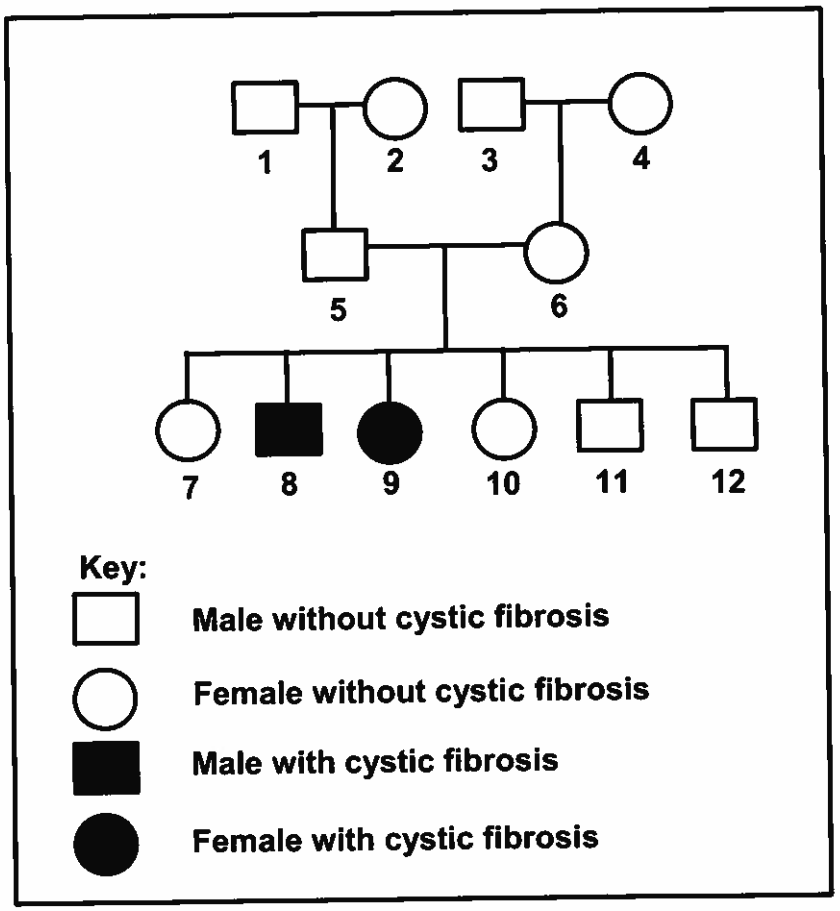
The diagram below shows four possible daughter cells formed at the end of this meiosis.



2.3.4 Draw cell **D**, including the missing 4th chromosome. (3)
(11)

2.4 Cystic fibrosis is a genetic disorder caused by a recessive allele (**b**).

The pedigree diagram below shows the inheritance of cystic fibrosis in a certain family.



2.4.1 How many generations are represented in the diagram above? (1)

2.4.2 Give the genotype of individual **9**. (1)

2.4.3 Explain why both individuals **5** and **6** must be heterozygous for cystic fibrosis. (4)

2.4.4 Using the letters **B** and **b**, do a genetic cross to show the inheritance of cystic fibrosis when heterozygous parents are crossed. (6)
(12)

2.5 Bt corn is a crop that has been genetically modified to be insect-resistant.

The table below shows the percentage of land used to grow Bt corn and the amount of insecticide used in a certain country between 1995 and 2010.

Year	Land used to grow Bt corn (%)	Amount of insecticide used (kg per hectare)
1995	0	0,2
2000	20	0,13
2005	40	0,05
2010	60	0,01

2.5.1 Describe how genetic engineering of Bt corn was done. (2)

2.5.2 Describe the relationship between the land used to grow Bt corn and the amount of insecticide used. (2)

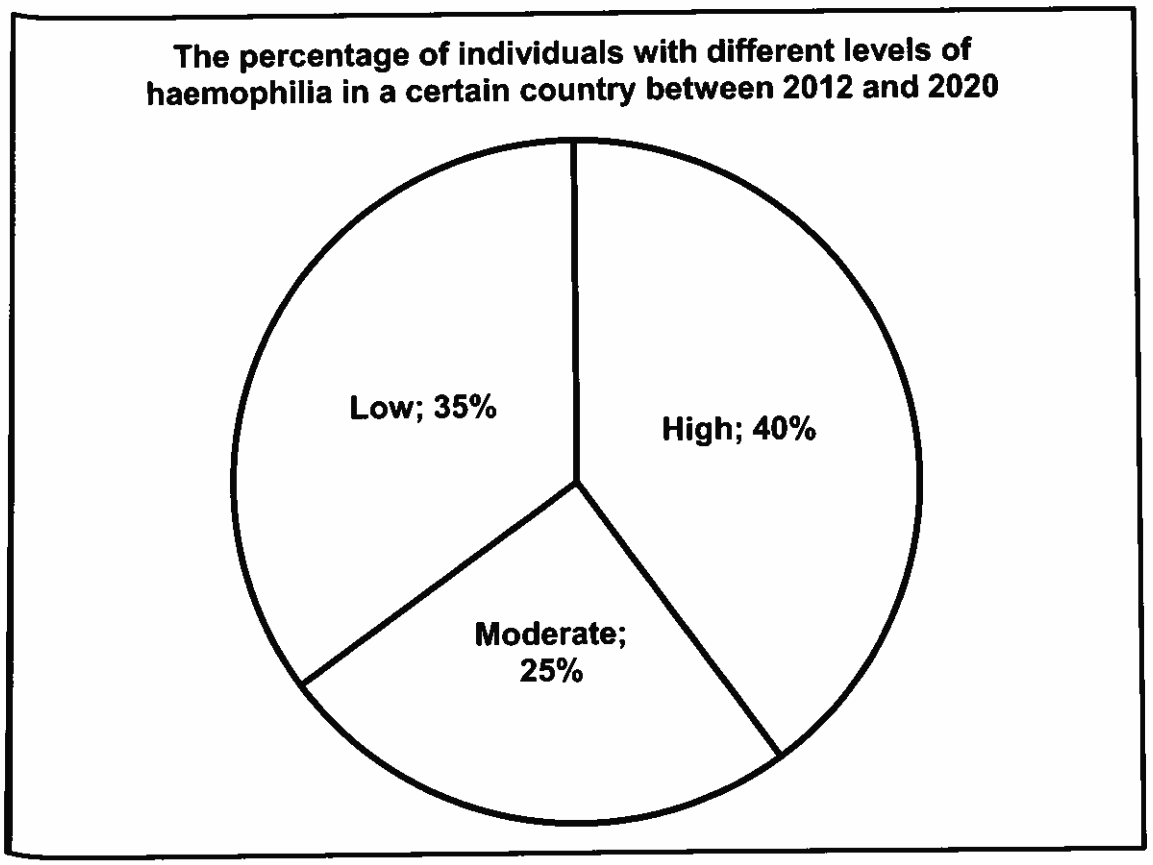
2.5.3 State TWO other plant characteristics that are genetically engineered to increase food security. (2)

2.5.4 Draw a bar graph to represent the percentage of land used to grow Bt corn from 1995 to 2010. (6)
(12)
[50]

QUESTION 3

3.1 In a certain country, 25 000 individuals were suffering from haemophilia between 2012 and 2020. Haemophilia is a genetic disorder that is caused by a mutation.

The pie chart below shows the percentage of individuals with different levels of haemophilia in this country.



3.1.1 Explain the effect of this mutation on an individual. (2)

3.1.2 Calculate the number of individuals who were moderately affected by haemophilia in this country. Show ALL working. (2)

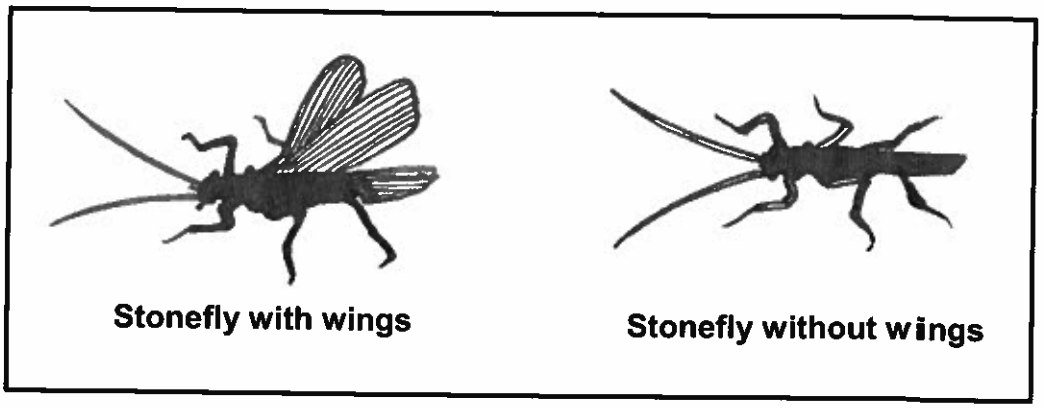
3.1.3 Explain why it would be expected that most of the individuals affected by haemophilia will be males. (3)
(7)

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3.2 Insects on islands without trees are likely to be wingless because flying is dangerous for them in an area with strong winds.

A certain island was once covered with tall trees. Over the years, there has been deforestation in some areas of the island. On this island, insects called stoneflies, have undergone natural selection. Some have wings and some do not have wings, depending on the area where they are found.

The diagram below shows stoneflies with and without wings.



Scientists wanted to determine the relationship between the presence of tall trees and the wings on the stoneflies.

- They selected six locations, of which three had tall trees and three were without trees.
- Using a specialised net, they collected thousands of stoneflies in each location.
- The samples were labelled according to the area of collection.
- These samples were all collected in the morning during summer.
- The number of stoneflies with wings and without wings at each location was counted and recorded.

3.2.1 Identify the:

(a) Independent variable (1)

(b) Dependent variable (1)

3.2.2 State TWO factors that were kept constant during the investigation. (2)

3.2.3 State TWO ways in which the reliability of this investigation was ensured. (2)

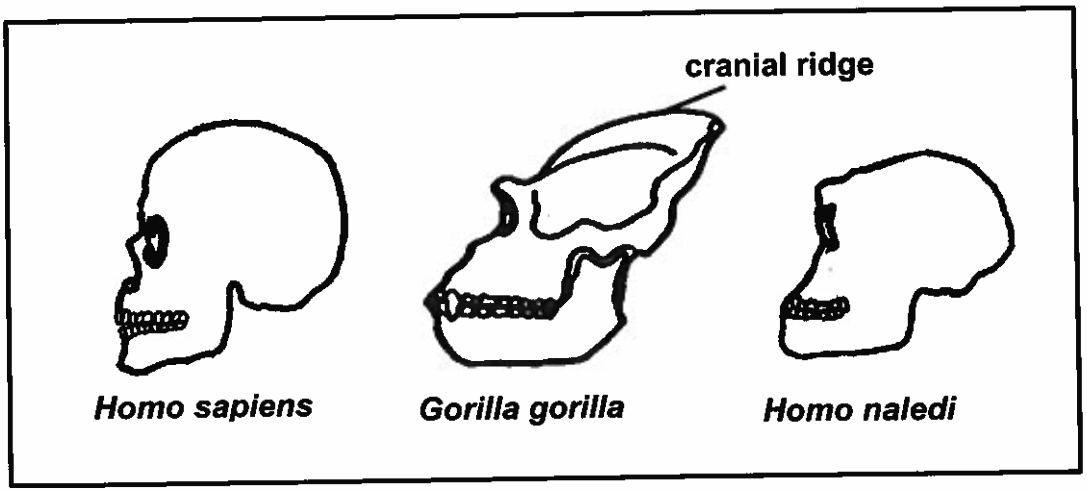
3.2.4 Explain why it would be expected that more stoneflies will have no wings in the areas without trees. (4)

3.2.5 Describe how Lamarck would have explained the evolution of stoneflies without wings in the areas without trees. (5)
(15)

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3.3 Describe the process of speciation through geographic isolation. **(7)**

3.4 The diagrams below represent the skulls of hominids.



3.4.1 List THREE similarities in relation to vision that are shared by these organisms. (3)

3.4.2 Name ONE species in the diagram that was most prognathous. (1)

3.4.3 Describe the TWO structures that caused the species named in QUESTION 3.4.2 to be most prognathous. (2)

3.4.4 *Homo naledi* was bipedal for most of its adult life.

Explain how the structure of *Homo naledi*'s skull would have assisted in bipedalism. (3)

3.4.5 Describe the difference between *Homo sapiens* and *Gorrilla gorilla* in relation to the shape of the:

(a) Spine (2)

(b) Pelvis (2)

3.4.6 Explain why the *Gorrilla gorilla* species has a cranial ridge. (2)
(15)

3.5 Read the passage below.

> Datura flowers open in the evening and release a powerful fragrance which attracts hawk moths. The Datura produces a highly addictive nectar which ensures that the hawk moths stay longer inside the flower and only visit Datura flowers.

3.5.1 Explain TWO ways in which the Datura plants ensure that they are reproductively isolated. (4)

3.5.2 State TWO other mechanisms that would ensure reproductive isolation in plants. (2)
(6)
[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150

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REPUBLIC OF SOUTH AFRICA

SENIORSERTIFIKAAT-EKSAMEN/
NASIONALE SENIORSERTIFIKAAT-EKSAMEN

LEWENSWETENSKAPPE V2

MEI/JUNIE 2024

LEWENSWETENSKAPPE: Vraestel 2

10832A

PUNTE: 150

TYD: 2½ uur

X05

Hierdie vraestel bestaan uit 17 bladsye.

Kopiereg voorbehou

INSTRUKSIES EN INLIGTING

Lees die volgende instruksies aandagtig deur voordat jy die vrae beantwoord.

1. Beantwoord AL die vrae.
2. Skryf AL die antwoorde in die ANTWOORDEBOEK.
3. Begin die antwoorde op ELKE vraag boaan 'n NUWE bladsy.
4. Nommer die antwoorde korrek volgens die nommeringstelsel wat in hierdie vraestel gebruik is.
5. Bied jou antwoorde volgens die instruksies van elke vraag aan.
6. Maak ALLE sketse met potlood en skryf die byskrifte met blou of swart ink.
7. Teken diagramme, tabelle of vloeidiagramme slegs wanneer dit gevra word.
8. Die diagramme in hierdie vraestel is NIE noodwendig volgens skaal geteken NIE.
9. MOENIE grafiekpapier gebruik NIE.
10. Jy moet 'n nieprogrammeerbare sakrekenaar, gradeboog en passer gebruik, waar nodig.
11. Skryf netjies en leesbaar.

Kopiereg voorbehou

AFDELING A

VRAAG 1

1.1 Verskeie opsies word as moontlike antwoorde op die volgende vrae gegee. Kies die antwoord en skryf slegs die letter (A–D) langs die vraagnommers (1.1.1 tot 1.1.9) in die ANTWOORDEBOEK neer, bv. 1.1.10 D.

1.1.1 Watter vroulike wetenskaplike het X-strale van die DNS/DNA-molekuul geneem en tot die gevolgtrekking gekom dat DNS/DNA 'n heliksvorm het?

A Watson
B Franklin
C Crick
D Wilkins

1.1.2 'n Sel met 14 chromosome ondergaan meiose.

Wat is die getal chromatiede in hierdie sel aan die begin van meiose?

A 7
B 14
C 28
D 56

1.1.3 By die oorerwing van bloedgroepe is daar ...

A twee fenotipes wat deur drie allele beheer word.
B drie fenotipes wat deur twee allele beheer word.
C vier fenotipes wat deur drie allele beheer word.
D vier fenotipes wat deur twee allele beheer word.

1.1.4 Die volgende stellings verwys na seldeling:

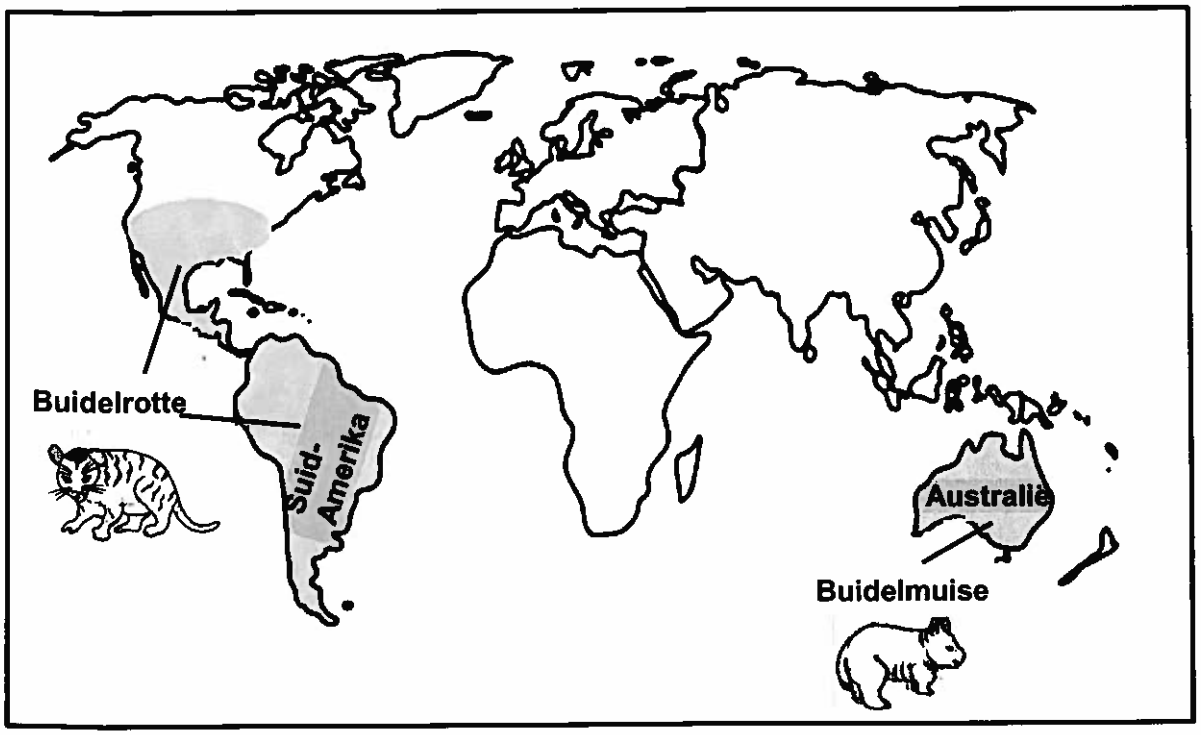
(i) Oorkruising vind plaas
(ii) Dra by tot genetiese variasie in 'n bevolking
(iii) Produseer selle met 'n diploïede getal chromosome
(iv) Produseer slegs somatiese selle

Watter EEN van die volgende kombinasies van stellings verwys na meiose?

A Slegs (i), (ii) en (iii)
B Slegs (i) en (ii)
C Slegs (ii) en (iv)
D Slegs (ii) en (iii)

1.1.5 Daar word aanvaar dat buidelrotte ('opossums') en buidelmuise ('wombats') uit 'n gemeenskaplike voorouer ontstaan het.

Die ingekleurde gedeeltes van die diagram hieronder toon die verspreiding van hierdie spesies.



Die tipe bewys vir evolusie wat in die diagram voorgestel word, is ...

A biogeografie.
B modifikasie deur afstamming.
C genetika.
D kultureel.

1.1.6 'n Plant met geel (y) en ronde (R) ertjies word gekruis met 'n plant met groen (Y) en gerimpelde (r) ertjies.

Watter EEN van die volgende is die moontlike genotipes van die ouers (P_1)?

A yyRR x YYRr
B YyRR x yyrr
C Yyrr x YYRR
D yyRR x YYrr

1.1.7 'n Gedeelte van DNS/DNA bevat:

- 31% adenien in string **1**
- 12% sitosien in string **2**
- 27% guanien in string **2**

In hierdie gedeelte van DNS/DNA sal daar ook ... wees.

A 31% adenien in string **2**
B 12% sitosien in string **1**
C 31% timien in string **2**
D 27% sitosien in string **2**

1.1.8 Twee mense het elk vier beskrywings oor hulleself gegee.

	PERSOON 1	PERSOON 2
P	Ek kan my tong rol.	Ek kan nie my tong rol nie.
Q	Ek is 150 cm lank.	Ek is 153 cm lank.
R	Ek het los oorlelle.	Ek het oorlelle wat vas is.
S	My bloedgroep is A.	My bloedgroep is AB.

Watter EEN van die volgende kombinasies is voorbeelde van diskontinue variasie?

A P, Q en S
B P, R en S
C Q, R en S
D P, Q, R en S

1.1.9 Die fase in meiose waar chromatiede na die pole toe getrek word, is ...

A anafase I.
B telofase I.
C metafase II.
D anafase II.

(9 x 2) **(18)**

1.2 Gee die korrekte **biologiese term** vir elk van die volgende beskrywings. Skryf slegs die term langs die vraagnommers (1.2.1 tot 1.2.8) in die ANTWOORDEBOEK neer.

1.2.1 'n Gedeelte van 'n DNS/DNA-molekuul wat vir 'n spesifieke eienskap kodeer

1.2.2 'n Patroon van swart stawe wat die resultaat van DNS/DNA-analise is

1.2.3 Evolusie wat gekenmerk word deur lang periodes met geen veranderinge nie en afgewissel word deur kort periodes waar vinnige verandering plaasvind

1.2.4 Die produksie van 'n geneties identiese kopie van 'n organisme deur biotegnologie te gebruik

1.2.5 Ongedifferensieerde selle in diere wat die vermoë het om enige soort weefsel te vorm

1.2.6 'n Genetiese afwyking wat veroorsaak dat 'n persoon nie tussen die kleure rooi en groen kan onderskei nie

1.2.7 Die deel van die plant waar die manlike gamete geproduseer word

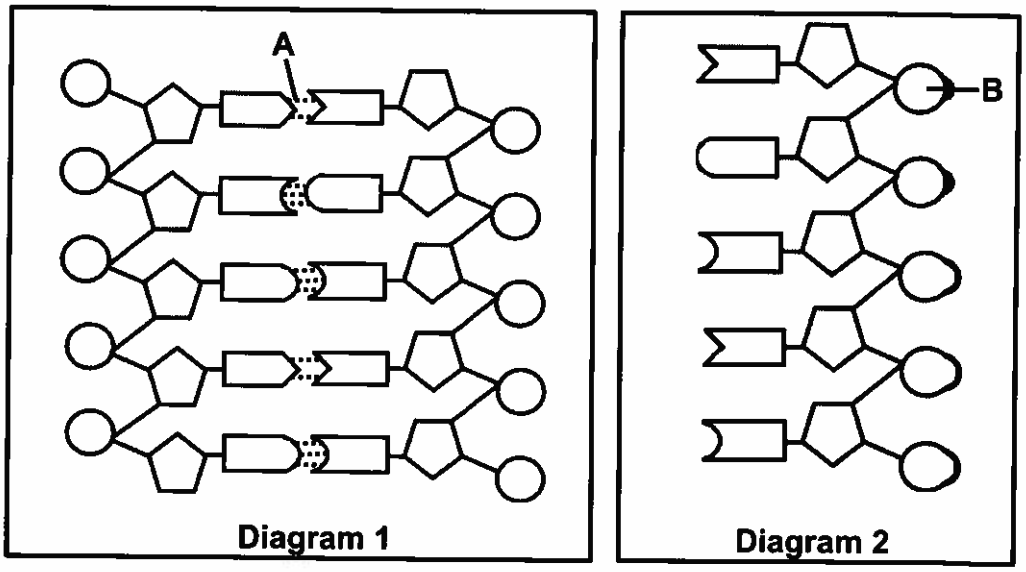
1.2.8 Die struktuur wat twee chromatiede verbind (8 x 1) **(8)**

1.3 Dui aan of elk van die stellings in KOLOM I van toepassing is op **SLEGS A**, **SLEGS B**, **BEIDE A EN B** of **GEENEEN** van die items in KOLOM II nie. Skryf **slegs A**, **slegs B**, **beide A en B** of **geeneen** langs die vraagnommers (1.3.1 tot 1.3.3) in die ANTWOORDEBOEK neer.

	KOLOM I	KOLOM II
1.3.1	Die tipe dominansie waar geeneen van die twee allele dominant oor die ander een is nie en 'n nageslag met 'n intermediêre fenotipe tot gevolg het	A: Volledige dominansie B: Kodominansie
1.3.2	Die punt waar twee chromatiede tydens oorkruising oorvleuel	A: Chiasma B: Lokus
1.3.3	Die wetenskaplike wat die wet van segregasie voorgestel het	A: Darwin B: Lamarck

(3 x 2) **(6)**

1.4 Die diagramme hieronder stel twee tipes nukleïensure voor.



1.4.1 Identifiseer die nukleïensuur wat in diagram **1** getoon word. (1)

1.4.2 Identifiseer:

(a) **A** (1)

(b) **B** (1)

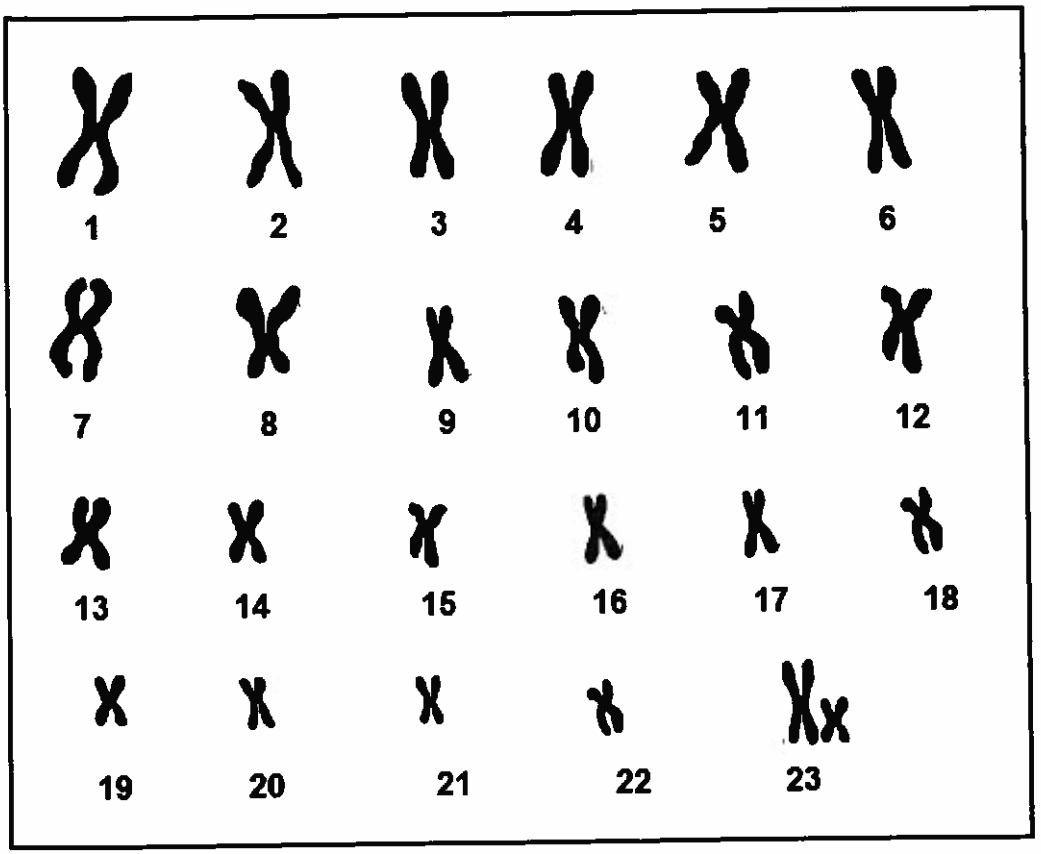
1.4.3 Noem die tipe suiker wat aangetref word in die nukleïensuur wat in diagram **2** voorgestel word. (1)

1.4.4 Watter diagram (**1** of **2**) stel 'n nukleïensuur voor wat gebruik word om:

(a) Die mens se voorouers vas te stel (1)

(b) Vir vaderskap te toets (1)
(6)

1.5 Die diagram hieronder toon die kariotipe van 'n gameet van 'n individu.



1.5.1 Noem die tipe mutasie wat plaasgevind het tydens die produksie van hierdie gameet. (1)

1.5.2 Watter tipe gameet word in die kariotipe voorgestel? (1)

1.5.3 Vir hierdie gameet, gee die getal:

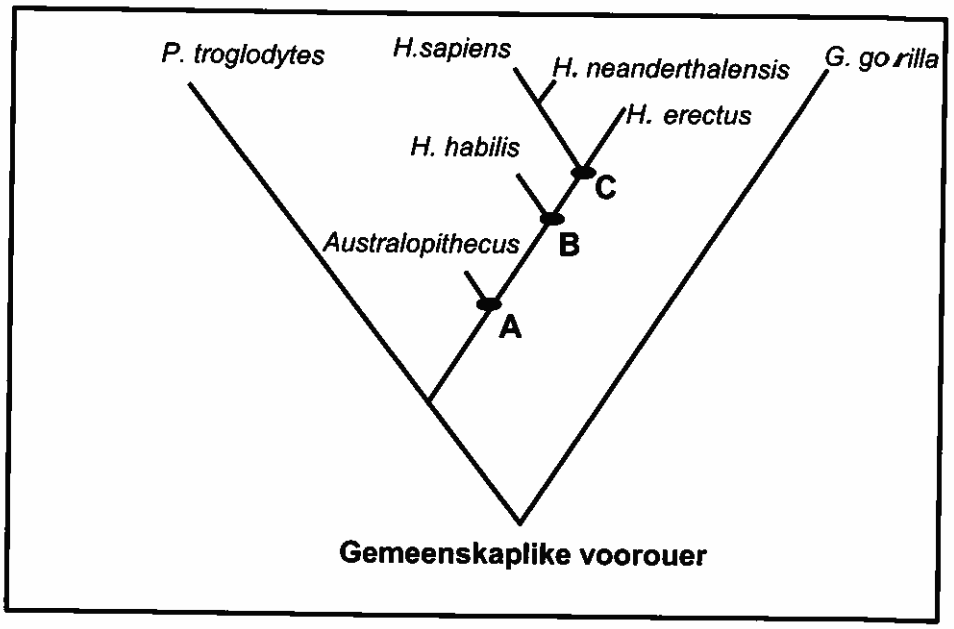
(a) Outosome (1)

(b) Gonosome (1)

1.5.4 Hierdie gameet versmelt met 'n normale gameet.

Gebruik X- en Y-voorstelling en skryf die geslagschromosome van die nageslag neer. (2)
(6)

1.6 Die diagram hieronder toon die evolusionêre verwantskap tussen verskillende spesies.



1.6.1 Identifiseer die tipe diagram wat hierbo getoon word. (1)

1.6.2 Gee die:

(a) Genus wat tot die *Australopithecus* by **A** aanleiding gegee het (1)

(b) LETTER wat die mees onlangse gemeenskaplike voorouer van beide *H. sapiens* en *H. erectus* voorstel (1)

1.6.3 Noem TWEE spesies wat dieselfde tyd as *H. erectus* bestaan het. (2)

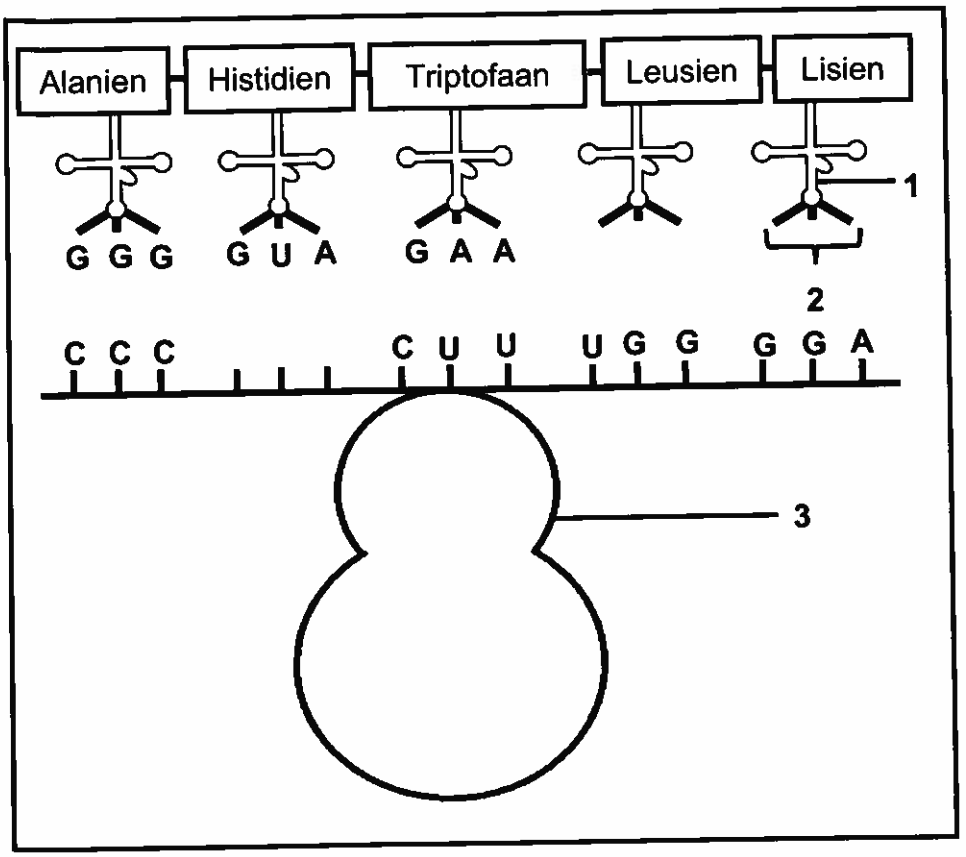
1.6.4 Gee EEN voorbeeld van die fossiel van *Australopithecus africanus* wat in Suid-Afrika gevind is. (1)
(6)

TOTAAL AFDELING A: 50

AFDELING B

VRAAG 2

2.1 Die diagram hieronder stel 'n fase tydens die sintese van 'n sekere proteïen voor.



2.1.1 Identifiseer organel **3**. (1)

2.1.2 Beskryf die rol van molekuul **1** tydens hierdie stadium van proteïen-sintese. (2)

2.1.3 Gee die volgorde van die stikstofbasisse:

(a) By **2** (1)

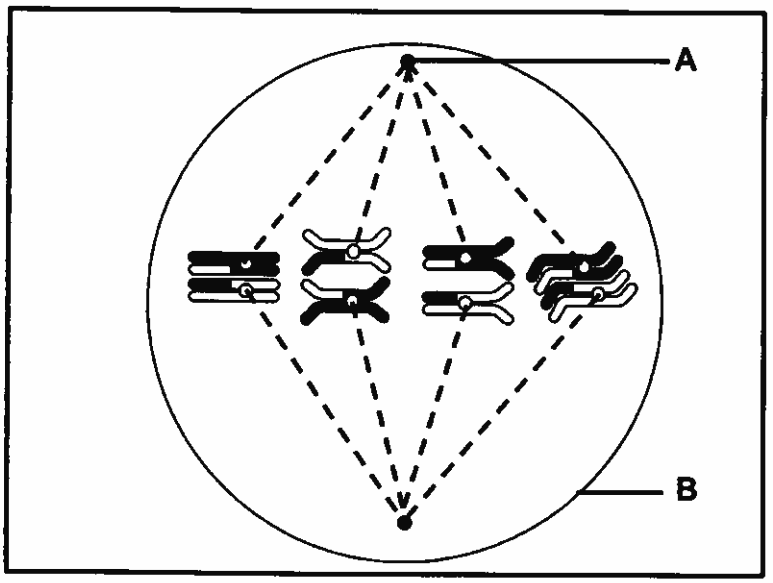
(b) Op die DNS/DNA-molekuul wat vir histidien gekodeer het (2)

2.1.4 Tydens die sintese van dieselfde proteïen was daar 'n verandering in die volgorde van die aminosure omdat alanien deur triptofaan vervang is.

Verduidelik die moontlike rede hiervoor. (3)
(9)

2.2 Beskryf *transkripsie*. **(6)**

2.3 Die diagram hieronder stel metafase **I** van meiose voor.

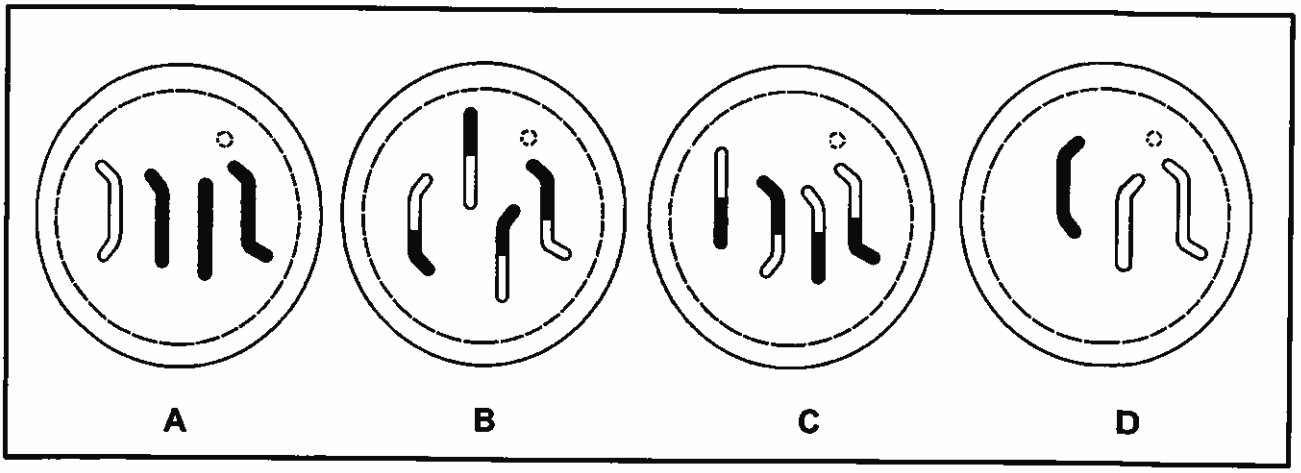


2.3.1 Identifiseer deel **B**. (1)

2.3.2 Noem EEN funksie van deel **A**. (1)

2.3.3 Verduidelik die bydrae van metafase **I** vir natuurlike seleksie. (6)

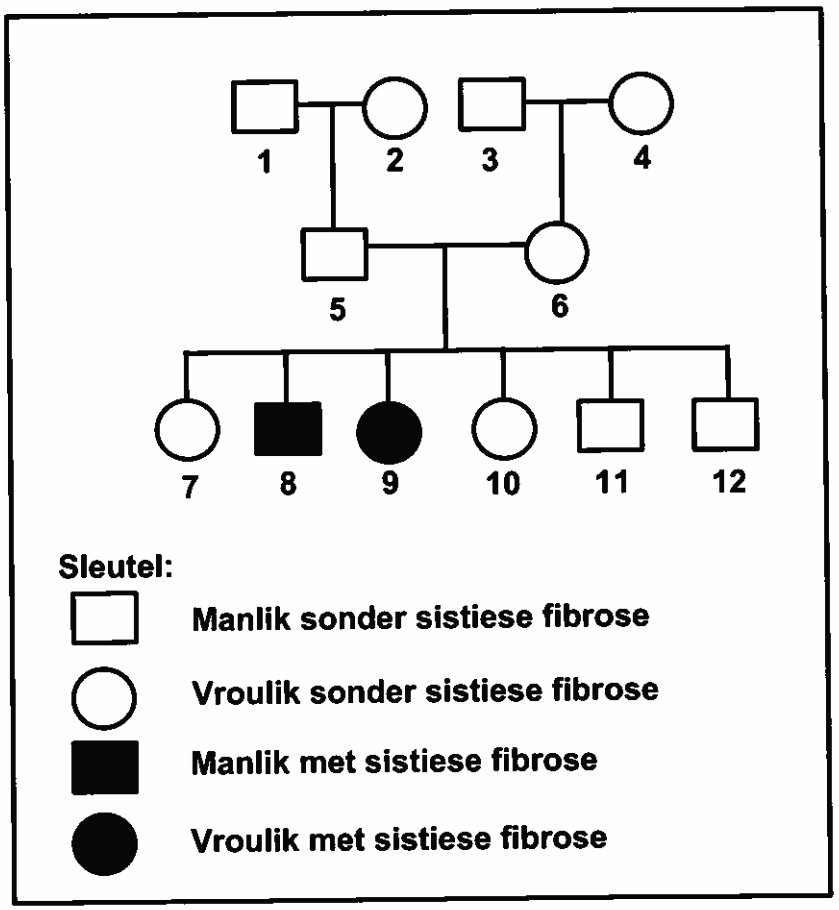
Die diagram hieronder toon vier moontlike dogterselle wat aan die einde van hierdie meiose gevorm het.



2.3.4 Teken sel **D** wat die ontbrekende 4de chromosoom insluit. (3)
(11)

2.4 Sistiese fibrose is 'n genetiese afwyking wat deur 'n resessiewe alleel (**b**) veroorsaak word.

Die stamboomdiagram hieronder toon die oorerwing van sistiese fibrose in 'n sekere familie.



2.4.1 Hoeveel generasies word in die diagram hierbo voorgestel? (1)

2.4.2 Gee die genotipe van individu **9**. (1)

2.4.3 Verduidelik waarom beide individue **5** en **6** heterosigoties vir sistiese fibrose moet wees. (4)

2.4.4 Deur die letters **B** en **b** te gebruik, maak 'n genetiese kruising om die oorerwing van sistiese fibrose te toon wanneer heterosigotiese ouers gekruis word. (6)
(12)

2.5 Bt-mielies is 'n gewas wat geneties gemodifiseerd is om weerstandig teen insekte te wees.

Die tabel hieronder toon die persentasie grond wat gebruik is om Bt-mielies aan te plant en die hoeveelheid insekdoder wat tussen 1995 en 2010 in 'n sekere land gebruik is.

Jaar	Grond gebruik om Bt-mielies aan te plant (%)	Hoeveelheid insekdoder gebruik (kg per hektaar)
1995	0	0,2
2000	20	0,13
2005	40	0,05
2010	60	0,01

2.5.1 Beskryf hoe genetiese manipulasie van Bt-mielies gedoen is. (2)

2.5.2 Beskryf die verwantskap tussen die grond wat gebruik is om Bt-mielies aan te plant en die hoeveelheid insekdoder wat gebruik is. (2)

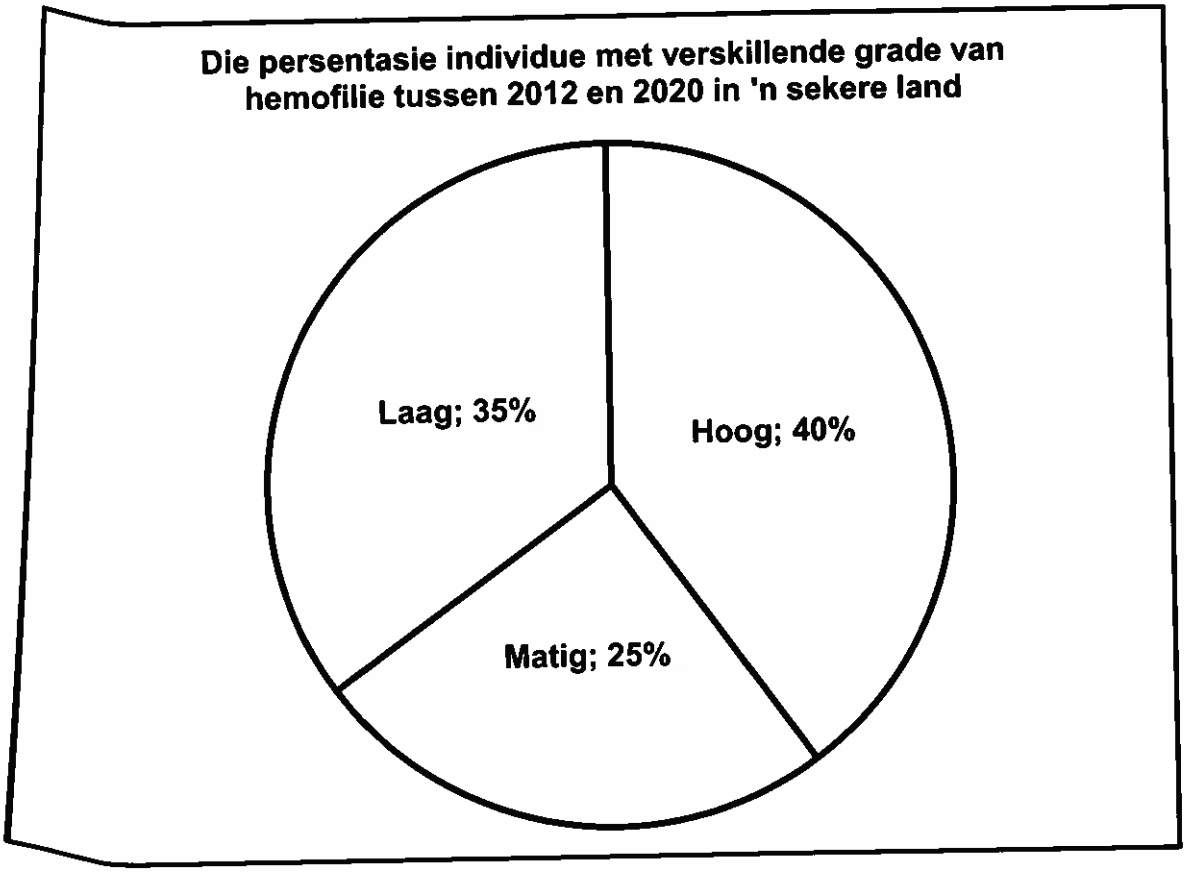
2.5.3 Noem TWEE ander eienskappe van plante wat geneties gemanipuleer is om voedselsekerheid te verhoog. (2)

2.5.4 Teken 'n staafgrafiek wat die persentasie grond voorstel wat gebruik is om Bt-mielies vanaf 1995 tot 2010 aan te plant. (6)
(12)
[50]

VRAAG 3

3.1 Tussen 2012 en 2020 was daar 25 000 individue wat in 'n sekere land aan hemofilie gely het. Hemofilie is 'n genetiese afwyking wat deur 'n mutasie veroorsaak word.

Die sirkelgrafiek hieronder toon die persentasie individue met verskillende grade van hemofilie in hierdie land.



3.1.1 Verduidelik die effek van hierdie mutasie op 'n individu. (2)

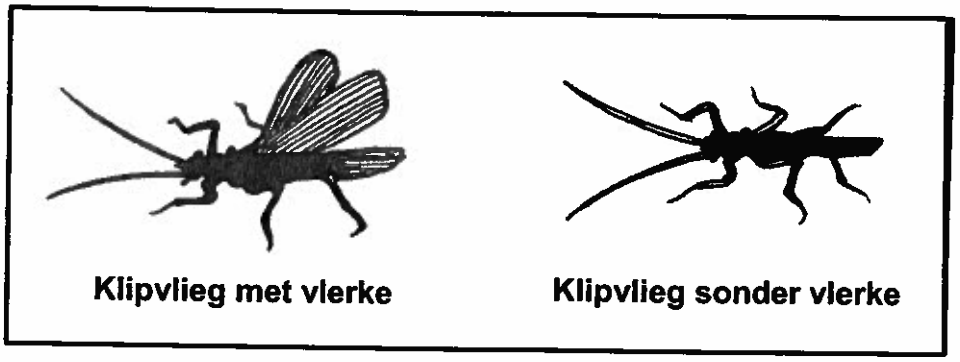
3.1.2 Bereken die getal individue in hierdie land wat matig deur hemofilie aangetas is. Toon ALLE berekeninge. (2)

3.1.3 Verduidelik waarom daar verwag kan word dat die meeste individue wat deur hemofilie aangetas is, mans sal wees. (3)
(7)

3.2 Insekte op eilande sonder bome sal waarskynlik nie vlerke hê nie (vlerkloos) omdat dit vir hulle gevaarlik is om in 'n area te vlieg waar daar sterk winde is.

'n Sekere eiland was eens op 'n tyd toe onder lang bome. Daar het met verloop van jare ontbossing in sekere areas van die eiland plaasgevind. Op hierdie eiland het insekte, genaamd klipvlieë, natuurlike seleksie ondergaan. Sommige het vlerke en sommige is vlerkloos, afhangend van die area waar hulle voorkom.

Die diagram hieronder toon klipvlieë met vlerke en sonder vlerke.



Klipvlieg met vlerke **Klipvlieg sonder vlerke**

Wetenskaplikes wou die verwantskap tussen die aanwesigheid van lang bome en die vlerke van steenvlieë bepaal.

- Hulle het ses gebiede gekies, waarvan drie lang bome en drie geen bome gehad het nie.
- Hulle het duisende klipvlieë in elke gebied versamel deur van 'n spesiale net gebruik te maak.
- Die monsters is gemerk na aanleiding van die gebied waarin dit versamel is.
- Hierdie monsters is almal in die oggend tydens die somer versamel.
- Die getal klipvlieë met vlerke en die wat vlerkloos was, is in elke gebied getel en aangeteken.

3.2.1 Identifiseer die:

(a) Onafhanklike veranderlike (1)

(b) Afhanklike veranderlike (1)

3.2.2 Noem TWEE faktore wat tydens die ondersoek konstant gehou is. (2)

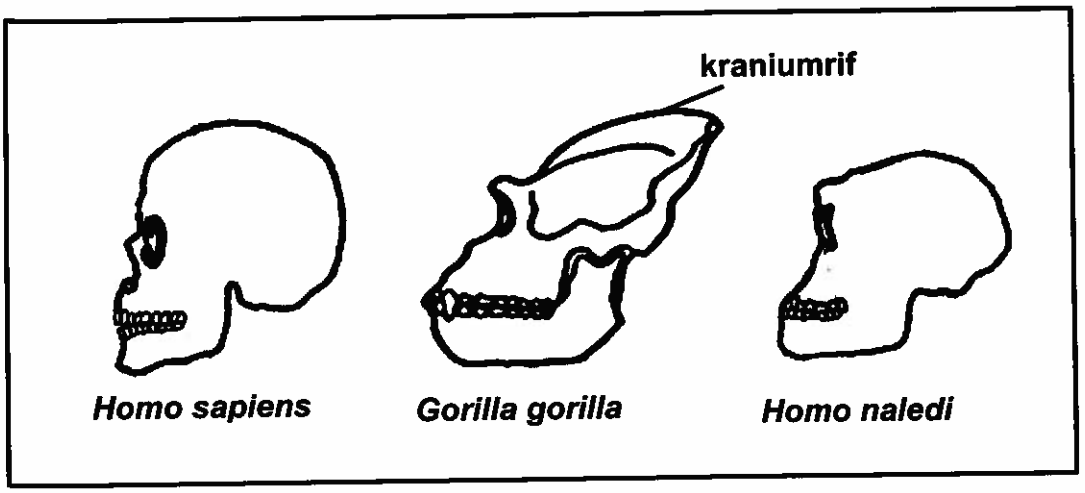
3.2.3 Noem TWEE maniere waarop die betroubaarheid van hierdie ondersoek verseker is. (2)

3.2.4 Verduidelik waarom 'n mens kan verwag dat daar meer vlerklose klipvlieë in die gebiede sonder bome sal wees. (4)

3.2.5 Beskryf hoe Lamarck die evolusie van vlerklose klipvlieë in die gebiede sonder bome sou verduidelik. (5)
(15)

3.3 Beskryf die proses van spesiasie/spesievorming deur geografiese isolasie. **(7)**

3.4 Die diagramme hieronder toon die skedels van hominiede.



3.4.1 Maak 'n lys van DRIE ooreenkomste wat hierdie organismes ten opsigte van sig deel. (3)

3.4.2 Noem EEN spesie in die diagram wat die meeste prognaties was. (1)

3.4.3 Beskryf die TWEE strukture wat veroorsaak het dat die spesie wat in VRAAG 3.4.2 genoem is, die meeste prognaties was. (2)

3.4.4 *Homo naledi* was bipedaal/tweevoetig vir die grootste deel van sy volwasse lewe.

Verduidelik hoe die struktuur van *Homo naledi* se skedel met bipedalisme kon gehelp het. (3)

3.4.5 Beskryf die verskil tussen *Homo sapiens* en *Gorrilla gorilla* met betrekking tot die vorm van die:

(a) Ruggraat (2)

(b) Pelvis/Bekken (2)

3.4.6 Verduidelik waarom die *Gorrilla gorilla*-spesie 'n kraniumrif het. (2)
(15)

3.5 Lees die uittreksel hieronder.

> Die blomme van die stinkblaar ('Datura') maak in die aand oop en stel 'n kragtige geur vry wat pylstertmotte aantrek. Die stinkblaar produseer 'n hoogs verslawende nektar wat verseker dat die pylstertmotte langer in die blom bly en slegs die stinkblaar besoek.

3.5.1 Verduidelik TWEE maniere waarop die stinkblaar verseker dat hulle voortplantingsisolering het. (4)

3.5.2 Noem TWEE ander meganismes wat voortplantingsisolering by plante verseker. (2)

(6)

[50]

TOTAAL AFDELING B: 100
GROOTTOTAAL: 150

Kopiereg voorbehou