



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

LIFE SCIENCES P1

NOVEMBER 2009

MEMORANDUM

MARKS: 150

This memorandum consists of 10 pages.

SECTION A**QUESTION 1**

- | | | | | |
|-----|-------|--|---------|-------------|
| 1.1 | 1.1.1 | D✓✓ | | |
| | 1.1.2 | B✓✓ | | |
| | 1.1.3 | C✓✓ | | |
| | 1.1.4 | C✓✓ | | |
| | 1.1.5 | A✓✓ | (5 x 2) | (10) |
| 1.2 | 1.2.1 | Fallopian tube✓/oviduct | | |
| | 1.2.2 | Graafian follicle✓ | | |
| | 1.2.3 | Umbilical vein✓ | | |
| | 1.2.4 | Oxytocin✓ | | |
| | 1.2.5 | Seed✓ | | |
| | 1.2.6 | Cervix✓ | | (6) |
| 1.3 | 1.3.1 | E✓ | | |
| | 1.3.2 | G✓ | | |
| | 1.3.3 | F✓ | | |
| | 1.3.4 | I✓ | | |
| | 1.3.5 | A✓ | | |
| | 1.3.6 | D✓ | | (6) |
| 1.4 | 1.4.1 | Transcription✓ | | (1) |
| | 1.4.2 | 5✓ | | (1) |
| | 1.4.3 | GCU✓ – CAU✓ – UGG✓ | | (3) |
| | 1.4.4 | (a) The sequence of the amino acids will change✓/the actual amino acids could change and a new/different protein could form✓ | | (2) |
| | | (b) Mutation✓ | | (1) |
| | | | | (8) |

- 1.5 1.5.1 Anaphase II✓ (1)
- 1.5.2 Chromatids✓ are pulled towards the poles✓ (2)
- 1.5.3 A Spindle fibre✓
B Cell membrane✓ (2)
- 1.5.4 (a) 8✓ (1)
(b) 4✓ (1)
- 1.5.5 Ovary✓ (1)
- 1.5.6 No✓ (1)
- 1.5.7 Humans would have 23✓ chromosomes/46 chromatids in this phase. In this diagram only 4 chromosomes✓/8 chromatids are shown/incorrect✓ number ✓of chromosomes (2)
- 1.5.8 - Reduction/halving of chromosome number✓/keep chromosome number constant from generation to generation/prevents doubling of chromosome number at fertilisation
- Promotes/contributes to genetic variation✓
Formation of gametes/cells containing one allele of a gene pair✓
(Mark first TWO only) (2)
(13)
- 1.6 1.6.1 The flowers with petals attracted more insects✓ for pollination✓ than the flowers without petals (2)
OR
The flowers without petals may not have attracted insects✓ therefore less pollination✓
- 1.6.2 Some of the pollen tubes that developed were from the same flower ✓/self-pollination occurred and only make little growth into the style✓ /not all pollen grains make it to the ovary/does not fertilise the ovule (2)
- 1.6.3 Repeat the investigation and use the average✓
Increasing the size of the sample✓
Use the same size flowers✓
Use the same colour flowers✓
Use the flowers of the same apple tree✓
Ensure that all the flowers are pollen-free at the beginning of the investigation✓
Use the same number of flowers✓
The same number of days for pollination✓/prevention of pollination/
for fertilisation to take place any (3)
(Mark first THREE only) (7)

TOTAL SECTION A: 50

SECTION B**QUESTION 2**

- 2.1 2.1.1 A - prostate gland✓
B - vas deferens / sperm duct✓
E - urethra✓
G - nucleus✓ (4)
- 2.1.2 C - Stores sperms temporarily✓/sperms mature here
(Mark first ONE only)

F - Contain enzymes to break down the cell membrane of the egg cell✓
(Mark first ONE only) (2)
- 2.1.3 D✓ testis ✓/seminiferous tubules (2)
- 2.1.4 To keep the testes at a temperature that is (about 3 °C) lower than body temperature✓
A lower temperature is necessary for the production of healthy sperm✓/so that healthy sperms can survive (2)
- 2.1.5 (a) Interstitial cells✓/Cells of Leydig (1)
(b) Testosterone✓ (1)
- 2.1.6 (a) Severing of the vas deferens✓
Will not allow sperms to pass to urethra and into the female✓
and hence no fertilisation results✓ any (2)
- (b) Yes✓ (1)
- (c) HI virus is carried in body fluids✓/ seminal fluids/saliva/blood
Can infect a person through open wounds✓/blood transfusion/
sexual intercourse
Therefore vasectomy does not stop the transmission of HIV (2)
(17)
- 2.2 2.2.1 Accept day 14 or day 15✓ (1)
- 2.2.2 Days 0 - 7✓ (1)
- 2.2.3 - Causes the follicle to burst open✓/stimulates ovulation
- Stimulates the formation of the corpus luteum✓
(Mark first ONE only) (1)
- 2.2.4 - LH levels remain low up to day 12/13 ✓
- Then it increases sharply up to day 14✓
- After which it decreases and remains low✓ (3)

- 2.2.5 As the oestrogen level increases ✓
the thickness of the endometrium also increases ✓ (2)
- 2.2.6 Maintain the increase in the thickness of the endometrium ✓
for greater chance of implantation ✓ (2)
- 2.2.7 No ✓ (1)
- 2.2.8 The progesterone level ✓ has dropped ✓ /not maintained/corpus
luteum has started to degenerate (2)
- (13)**
[30]

QUESTION 3

3.1

3.1.1

- (a) $I^A I^B$ ✓✓ (2)
 (b) $I^A i$ ✓✓ / $I^A I^o$ $I^B i$ ✓✓ / $I^B I^o$ ii ✓✓ / $I^o I^o$ AB ✓✓ (2)
 AO ✓✓ BO ✓✓ OO ✓✓ (6)

3.1.2 It is a sex-linked ✓ disease
 caused by a recessive allele ✓
 carried on the X ✓ chromosome
 Males need only one recessive allele ✓ to have the disease because
 they have XY combination,
 while females have to have both recessive alleles ✓ to have haemophilia
 because they have an XX combination any (4)
(12)

3.2

3.2.1 Normal female: Chromosome pair 23 = XX ✓
 Female with Turner's syndrome: Only one X ✓ chromosome (2)

3.2.2 She will not be able to have children ✓ since her sex organs will
 not develop ✓ / no menstrual cycle because there are underdeveloped
 gonads and therefore no hormones (2)
(Mark first ONE only) (4)

3.3

3.3.1 $\frac{102}{120} \times \frac{100}{1} \%$
 = 85 ✓ % (2)

3.3.2 Equal number of boys and girls ✓
 Take a much larger sample ✓ / repeat samples in another school/
 another population (2)
(Mark first TWO only) (4)

3.4

P₁ phenotype Black x Brown ✓
 genotype Bb x bb ✓

Meiosis

G B, b x b ✓

Fertilisation

F₁ genotype Bb and bb ✓
 phenotype Black and brown ✓

gametes	b
B	Bb
b	bb

OR

1 mark for correct gametes
 1 mark for correct genotypes

1 mark for stating P₁ and F₁
 1 mark for stating meiosis and fertilisation any **(6)**

- 3.5 - Although contraceptives are easily available nowadays, many teenagers are not well informed about them✓
- Some people feel that morality has decreased significantly✓
- Families, nowadays, are less likely to provide teenagers with care and discipline✓
- Teenagers are more exposed to sex in the media in these days✓
- Teenagers are increasingly able to make their own decisions✓
- Abortions are now legal and easily available✓

(Mark first FOUR only)

any **(4)**
30

TOTAL SECTION B: 60

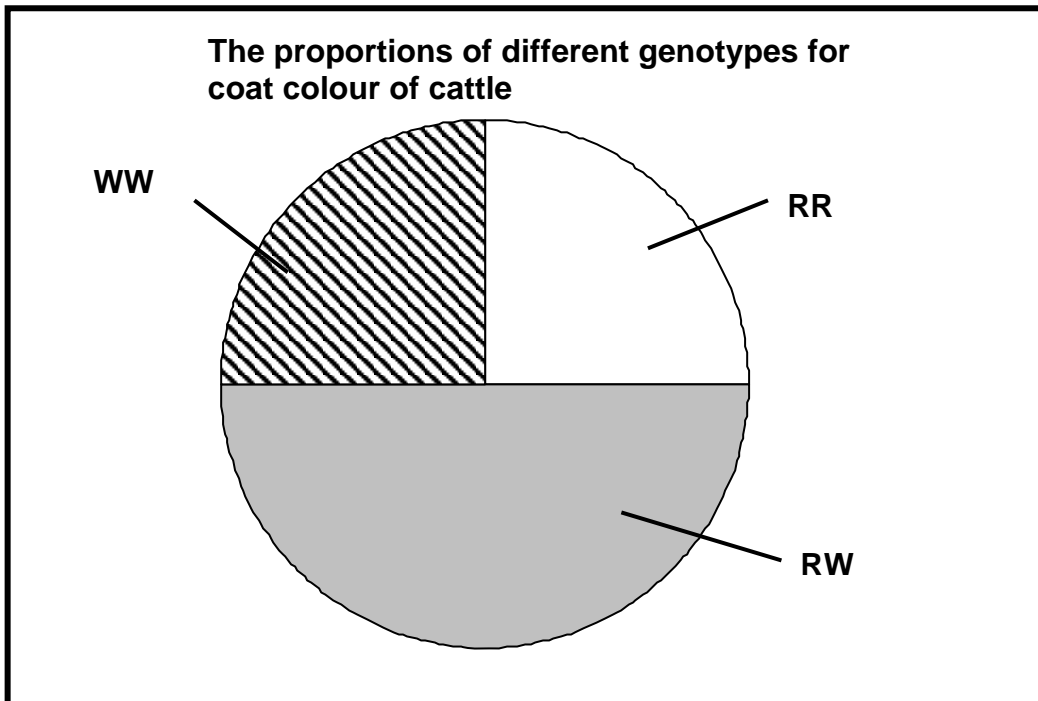
SECTION C

QUESTION 4

4.1

4.1.1 1 : 2 : 1 ✓ ✓ (2)

4.1.2



Rubric for the mark allocation of the pie chart

Correct type of graph	1
Caption	1
Correct proportions of slices	1: 1 correct slice 2: 2 to 3 correct slices
Label / key for each slice	1 mark for each label

NOTE: If the wrong type of graph is drawn: marks will be lost for "correct type of graph" as well as for drawing the slices in correct proportions. (7)

4.1.3 Both alleles ✓ for fur colour are equally dominant ✓ and therefore both are expressed in the phenotype ✓

OR

Neither of the alleles ✓ for red or white colour are dominant over each other ✓ and therefore no one colour alone is expressed/ masked in the phenotype ✓ (3)
(12)

- 4.2 4.2.1 - Determine the sample size✓/ number of boys and girls per grade
 - Design a table to record the results✓
 - Organise the ink pad and paper to take the fingerprint type of each learner✓/organise a way to obtain fingerprints
 - Time and place to be arranged✓
(Mark first FOUR only) (4)
- 4.2.2 (a) Number of learners✓ with different fingerprint types✓ (2)
- (b) No✓ (1)
- (c) Results indicate✓ that most learners✓ have the plain loop type✓ of fingerprinting any 2
OR
 Results indicate✓ that learners with a plain arch✓ do not make up the largest number✓ any 2
OR
 Results ✓ are not in line with the conclusion✓ (2)
- 4.2.3 (a) **Advantages**
 Criminals can be identified✓/biological evidence
 Deceased bodies can be identified✓ (2)
(Mark first TWO only)
- (b) **Disadvantages**
 People can be framed✓
 Infringing on the rights of people✓/invasion of privacy
 It is costly✓ (2)
(Mark first TWO only) (13)
- 4.3 **Advantages of using GMO's as a source of food**
- Control pests with specific genes inserted into the crop✓ which is less harmful to the environment than pesticides✓/ Reduce the need for the use of chemicals
 - Selecting the best genes to produce better resistant crops✓/stronger offspring to withstand harsh environmental conditions✓
 - Using specific genes to increase crop yields✓/life stock improvement for food security✓
 - Selecting genes to increase shelf life of plant products✓ so that there is minimal waste✓
 - Selecting genes that delay ripening of fruits✓ to meet the demand✓ locally and internationally
 - Using specific genes to improve nutritional value✓ of food for better health✓
 - Using specific genes to introduce new traits in crops✓ to suit specific needs✓ of a population (e.g. to increase vitamin A in food) any (6 x 2) (12)

ASSESSING THE PRESENTATION OF THE ESSAY

Marks	Descriptions
3	Well structured – demonstrates insight and understanding of question
2	Minor gaps in the answer
1	Attempted but with significant gaps in the answer
0	Not attempted/nothing written other than question number

(3)
(15)
[40]

TOTAL SECTION C: 40
GRAND TOTAL: 150