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✓ (b) 4✓	(1) (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 OR The flowers without petals may not have attracted insects✓ therefore less pollination✓	(2)
	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 ***(Mark first THREE only)***	(3) **(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 ^{o}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^AI^B ✓✓ | AB✓✓ (2)

(b) I^Ai✓✓/ I^AI^o I^Bi ✓✓/ I^BI^o ii✓✓/ I^oI^o | 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 $\frac{102}{120}$✓ x $\frac{100}{1}$%
= 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

P_1 phenotype Black x Brown✓
genotype Bb x bb✓

Meiosis

G B, b x b ✓

Fertilisation

F_1 genotype Bb and bb✓
phenotype Black and brown✓

OR

gametes	b
B	Bb
b	bb

1 mark for correct gametes
1 mark for correct genotypes

1 mark for stating P_1 and F_1
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✓
- Abortions are now legal and easily available✓

(Mark first FOUR only) any **(4)**

30

TOTAL SECTION B: 60

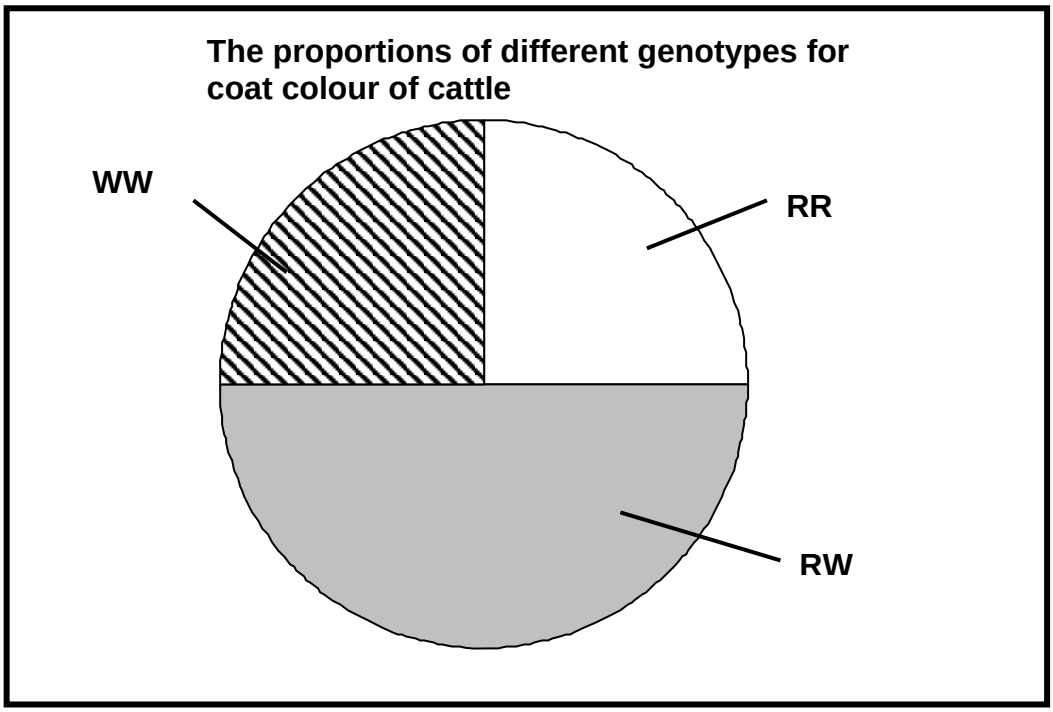
SECTION C

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