education

Department of Education
FREE STATE PROVINCE

GRADE 12

LIFE SCIENCES P1

SEPTEMBER 2009

MARKING GUIDELINE

MARKS: 150

This memorandum consists of 9 pages.

SECTION A

Question 1

1.1

1.1.1 D✓✓
1.1.2 B✓✓
1.1.3 B✓✓
1.1.4 C✓✓
1.1.5 A✓✓

(5 x 2) (10)

1.2

1.2.1 Dominant ✓
1.2.2 Endometrium✓
1.2.3 Cloning✓
1.2.4 Pistil✓
1.2.5 Dihybrid✓ cross
1.2.6 Karyotype✓
1.2.7 Albinism✓
1.2.8 Daughter cells✓

(8)

1.3

1.3.1 D✓
1.3.2 G✓
1.3.3 A✓
1.3.4 B✓
1.3.5 E✓

(5)

1.4

1.4.1 E – vas deferens✓ (1)

1.4.2 (a) A – Stores urine✓temporarily

(b) D – Carries urine and semen✓

(c) H – Holds the testis away from the body to lower the temperature✓ for optimum sperm production/acts as temperature regulator (3)
***(Mark first ONE only*)**

1.4.3 Both glands secretes a substance that assist in the motility✓ and nutrition✓ of the spermatozoa (2)

1.4.4 G✓ – spermatozoa✓/male gametes (2)
(8)

1.5

1.5.1 (a) Normal haemoglobin - GAA✓
(b) Mutant haemoglobin - GUA✓ (2)

1.5.2 - Anaemia✓
- Lethargy✓
- Lack energy✓
- Poor growth and development✓ (3)

(Mark first THREE only)

1.5.4 Oxygen/(O_2)✓ (1)

1.5.5 25✓%✓ (2)
(8)

1.6

1.6.1 Type O✓ (1)

1.6.2 It has insufficient donors✓/used most by patients, etc. (1)
(or any other acceptable answer)

1.6.3 There are high numbers of people✓ with blood-borne diseases✓/ HIV/AIDS/hepatitis
OR
Certain beliefs✓ may make people hesitant to donate✓ blood (2)

1.6.4 (a) **P_1** phenotype James x Sarah✓
genotype $I^A I^B$ x I^A i✓

Meiosis

G I^A, I^B x I^A, i✓

Fertilization

F_1 genotype $I^A I^A$ I^A i $I^A I^B$ I^B i✓
phenotype 1AA: 1AO: 1AB:1BO ✓

OR

gametes	I^A	i
I^A	$I^A I^A$	I^A i
I^B	$I^A I^B$	I^B i

1 mark for correct gametes
1 mark for correct genotypes

P_1 and F_1 ✓
Meiosis and fertilization✓ max (6)

(b) Child - I^B i ✓ (1)
(11)

TOTAL SECTION A: 50

SECTION B
QUESTION 2
2.1

2.1.1 Metaphase I✓ (1)

2.1.2 A – Pole✓/centriole
B – Spindle fibre✓
C – Cytoplasm✓ (3)

2.1.3 4✓ (1)

2.1.4 Diploid✓ (1)

2.1.5 Homologous chromosome pairs arranged along the equator✓ (1)

2.1.6 Crossing over✓ (1)

2.1.7 Exchange of genetic material✓ to increase genetic variety/variation✓ (2)
(10)

2.2

2.2.1 DNA replication✓ (1)

2.2.2 A – DNA helix unwinds and strands separate✓
B – Nucleotides link up to form new strands✓
C – Two new identical strands form✓ (3)
(4)

2.3

2.3.1 A - LH✓
H - FSH✓ (2)

2.3.2 Ovulation✓ (1)

2.3.3 C - Corpus luteum✓
E - Ovum✓ (2)

2.3.4 For implantation✓ of the fertilized egg✓ (2)

2.3.5 Progesterone✓ maintains thick lining of uterus✓/prevents secretion of FSH (2)

2.3.6 When she is pregnant✓/taking contraceptives (1)
(10)

2.4

2.4.1 Plant A - YY✓
Plant B - yy✓ (2)

2.4.2 Yellow: green✓
= 3 : 1✓ (2)

2.4.3 Phenotype – green peas✓
Genotype - yy✓ (2)
(6)
[30]

QUESTION 3

3.1

3.1.1 The factors that are responsible for protein production in bacteria✓
OR
New targets for the development of antibiotics✓ (1)

3.1.2 Mutations✓ (1)

3.1.3 The drugs✓/antibiotics will interfere with protein synthesis✓ (2)

3.1.4 mRNA carries the coded message✓ from the nucleus to the ribosomes✓
tRNA✓ carries the amino acids according to the codons✓ of mRNA in the correct sequence✓ (4)

3.1.5 Amino acids✓ (1)
(9)

3.2

3.2.1 3.5✓ kg✓ (2)

3.2.2 The lower the birth weight✓ the higher the mortality rate✓
OR
The higher the birth weight✓ the lower the mortality rate✓ (2)

3.2.3 **The relationship between the birth weight and the mortality rate in a hospital in a city**

Birth weight (kg)	Mortality (%)
1.0	80
1.5	30
2.0	15
2.5	10
3.0	5
3.5	range 2 to 3
4.0	5
4.5	10
5.0	15

Caption✓
Correct column headings✓
Data in table: All 9 rows correct: 3 marks✓✓✓
5 to 8 rows correct✓✓
1 to 4 rows correct✓
Drawing of table✓ (6)

3.2.4 Visit more hospitals✓/clinics (1)

3.2.5 The higher✓ the birth weight the lower✓ the mortality rate up to 3.5 kg then, the higher✓ the birth weight the higher✓ the mortality rate (4)
(15)

3.3

3.3.1 Meiosis in the male testes results in 50% of the sperms having X✓ chromosomes and 50% having Y✓ chromosomes. There is an equal✓ chance of an X or Y chromosome fertilizing an ovum (Chance/random fertilization) any (2)

3.4

3.4.1 (a) In early interphase the cell is starting to replicate✓/duplicate the 2 DNA content
In mitosis prophase replication is completed✓ hence 4 DNA content (2)

(b) Meiosis I prophase the cell is still diploid✓/2n 4 DNA content
Meiosis II telophase the chromosome number is halved✓/n hence 2DNA content (2)
(4)

TOTAL SECTION B: 60

SECTION C

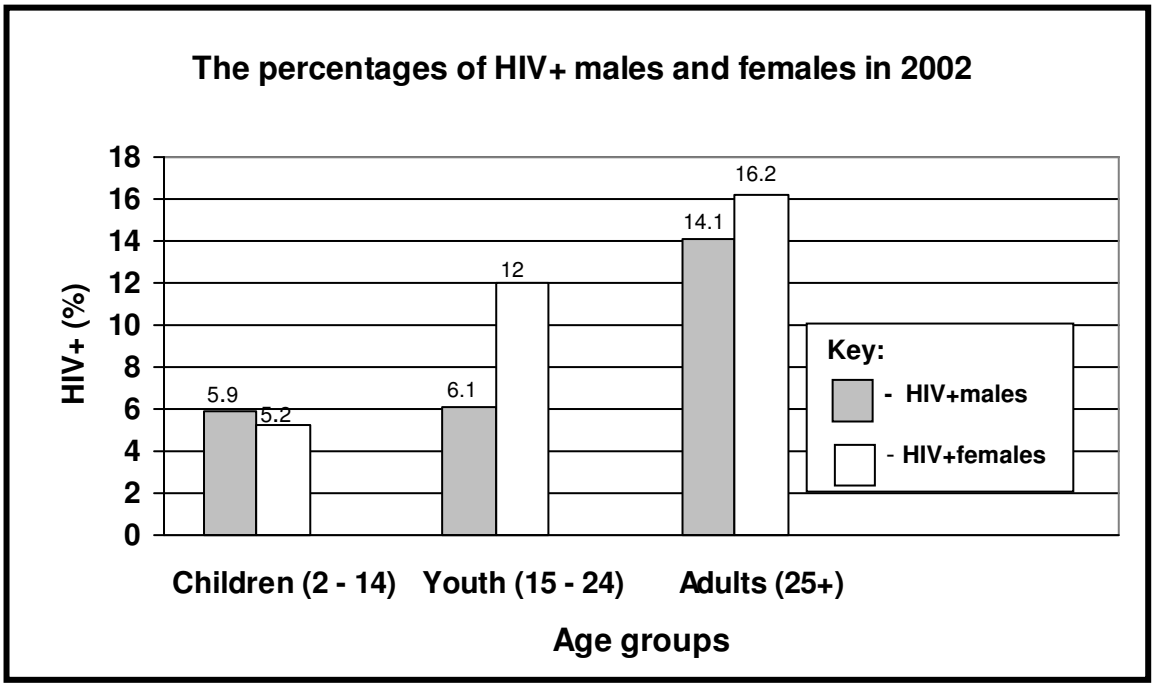
Question 4

4.1

4.1.1 Adults✓ (1)

4.1.2 They have been sexually active longer✓ than younger people (1)

4.1.3



Rubric for the mark allocation of the graph

Correct type of graph	1
Title of graph **(including 2002)**	1
Correct label for X-axis	1
Graphs labelled/key provided for 2 graphs	1
Correct label and units for Y-axis	1
Appropriate width and interval of bars	1
Appropriate scale for Y-axis	1
Drawing of the graph	1: 1 bar plotted correctly 2: 2 to 3 bars plotted correctly 3: 4 to 5 bars plotted correctly 4: all 6 bars plotted correctly

(11)

NOTE:

If the wrong type of graph is drawn: marks will be lost for 'correct type of graph'
If graphs are not drawn on the same system of axes, mark the first graph only using the given criteria

4.1.4 Because of fear✓/denial of the HIV+ problem (1)

4.1.5 (a) - Awareness of HIV status would enable partners to be protected if necessary✓
- Planning by the government and other agencies for medical care, budget, ARVs✓
- Help infected people and prevent further infection✓
- Increase faithfulness of partners to each other✓
- Job creation related to HIV testing✓
- More accurate statistics will become available✓

(Mark first TWO answers only) (2)

(b) - Take away individual rights to make their medical condition public knowledge✓
- Information can be misused e.g. by employers to exclude HIV positive people✓
- Can be stigmatized ✓/discriminated against
- Increased suicide rate✓
- The cost of testing could be unaffordable to the government✓ /individual
- Logistical difficulties relating to implementation and frequency of testing✓

(Mark first TWO answers only) (2)

(18)

4.2

4.2.1 1 - Deletion✓- when a gene is lost from a chromatid✓ (2)

2 - Inversion✓- when two genes that lie side by side on the chromosome swop position with each other✓ (2)

4.2.2

- Physical agents✓e.g. X-rays and ultraviolet radiation
- Chemical agents✓ e.g. carcinogenic mutagens
- They can occur spontaneously✓ (3)

(7)

4.3 Possible answers for the mini essay

Gonorrhoea

Caused by a bacterium✓ which attacks the urine-genital tract (1)

Signs and symptoms: (any **FOUR** relevant facts from the following)

- Burning sensation during urination✓
- Sores✓
- Yellowish discharge from the genital openings✓
- Painful, swollen joints and generally feeling ill as the bacteria spreads through the body✓
- In males it could result in sterility ✓
- In females it could result in sterility✓ any (4)

Treatment:

- Penicillin✓ / antibiotics (1)

Syphilis

Caused by a bacterium✓ (1)

Signs and symptoms: (any **FOUR** relevant facts from the following)

- First stages: Small, painless lump or sore on or near genital organs✓
- Rash or sores around the genital organs, anus, eyes, mouth or elsewhere✓
- Sore throat and mild fever✓
- Swelling of the lymph glands✓
- After 2 to 6 weeks all the visible symptoms disappear✓
- Latent stage: Most destructive stage✓
- Heart disease, liver, brain and nerve damage, blindness, insanity and eventually death✓ any (4)

Treatment:

- Penicillin✓ / antibiotics (1)

(12)

Description	**Marks**
Not attempted	0
Significant gaps in the logic and flow of the answer	1
Minor gaps in the logic and flow of the answer	2
Well structured – demonstrates insight and understanding	3

(15)

TOTAL SECTION C: 40

GRAND TOTAL: 150