



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P1

VERSION 2 (OLD CONTENT) FOR PART-TIME CANDIDATES

FEBRUARY/MARCH 2012

MEMORANDUM

MARKS: 150

This memorandum consists of 12 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES 2012

1. **If more information than marks allocated is given**
Stop marking when maximum marks is reached and put a wavy line and 'max' in the right hand margin.
2. **If, for example, three reasons are required and five are given**
Mark the first three irrespective of whether all or some are correct/incorrect.
3. **If whole process is given when only part of it is required**
Read all and credit relevant part.
4. **If comparisons are asked for and descriptions are given**
Accept if differences/similarities are clear.
5. **If tabulation is required but paragraphs are given**
Candidates will lose marks for not tabulating.
6. **If diagrams are given with annotations when descriptions are required**
Candidates will lose marks.
7. **If flow charts are given instead of descriptions**
Candidates will lose marks.
8. **If sequence is muddled and links do not make sense**
Where sequence and links are correct, credit. Where sequence and links is incorrect, do not credit. If sequence and links becomes correct again, resume credit.
9. **Non-recognized abbreviations**
Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation but credit the rest of answer if correct.
10. **Wrong numbering**
If answer fits into the correct sequence of questions but the wrong number is given, it is acceptable. Indicate that the candidate's numbering is wrong.
11. **If language used changes the intended meaning**
Do not accept.
12. **Spelling errors**
If recognizable accept provided it does not mean something else in Life Sciences or if it is out of context.
13. **If common names given in terminology**
Accept, provided it was accepted at the National memo discussion meeting.

14. **If only letter is asked for and only name is given (and vice versa)**
No credit.
15. **If units are not given in measurements**
Memorandum will allocate marks for units separately, except where it is already given in the question.
16. Be sensitive to **the sense of an answer, which may be stated in a different way.**
17. **Caption**
Credit will be given for captions to all illustrations (diagrams, graphs, tables, etc.) except where it is already given in the question.
18. **Code-switching of official languages (terms and concepts)**
A single word or two that appears in any official language other than the learners' assessment language used to the greatest extent in his/her answers should be credited, if it is correct. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official languages.
19. No changes must be made to the marking memoranda. In exceptional cases, the Provincial Internal Moderator will consult with the National Internal Moderator (and the External moderators if necessary).
20. Only memoranda bearing the signatures of the National Internal Moderator and the UMALUSI moderators and distributed by the National Department of Basic Education via the Provinces must be used in the training of markers and in the marking.

SECTION A**QUESTION 1**

1.1

1.1.1 A✓✓

1.1.2 C✓✓

1.1.3 B✓✓

1.1.4 C✓✓

1.1.5 D✓✓

(5 x 2) **(10)**

1.2

1.2.1 Helix✓/helical/spiral

1.2.2 Stem ✓/meristematic cells

1.2.3 Cancer✓

1.2.4 Genome✓

1.2.5 Genetic modification✓/genetic engineering/DNA technology

1.2.6 DNA profile✓/ fingerprint

1.2.7 Mitosis✓

1.2.8 Nucleotides✓

(8)

1.3

1.3.1 A only✓✓/A

1.3.2 A only✓✓/A

1.3.3 B only✓✓/B

1.3.4 B only✓✓/B

1.3.5 Both A & B✓✓/A & B

1.3.6 None✓✓

(6 x 2) **(12)**

1.4

1.4.1 37✓ °C ✓ (accept 36.9 to 37.1)

(2)

1.4.2 (Any answer between 36.9 to 37.1 - 36.2) ✓ = any answer between
0.7 to 0.9 ✓°C

(2)

1.4.3 The temperature rose✓

The oestrogen level decreased✓

The progesterone levels starts to increase✓

any (2)

(Mark first TWO only)1.4.4 Maintain the thickness✓ of the endometrium✓/uterus lining/prepare
the uterus lining for the embryo

(2)

(8)

1.5

1.5.1

(a) $I^A I^B \checkmark \checkmark / AB$ (2)(b) $I^A i \checkmark \checkmark / I^A I^O / AO$ $I^B i \checkmark \checkmark / I^B I^O / BO$ $ii \checkmark \checkmark / I^O I^O / OO$ (6)1.5.2 It is a sex-linked \checkmark disease
caused by a recessive allele \checkmark
carried on the X \checkmark chromosomeMales need only one recessive allele \checkmark to have the disease because
they have XY combination/Y chromosome has no alleles/H for clotting
while females have to have both recessive alleles \checkmark to have
haemophilia because they have an XX combinationany (4)
(12)**TOTAL SECTION A: 50**

SECTION B**QUESTION 2**

2.1

- 2.1.1 A – Chromosome ✓
 B – Centromere ✓
 C – Chromatid ✓
 D – Chiasma ✓ (4)

2.1.2 Crossing over ✓ (1)

2.1.3 Mixing of genetic material ✓ so that the gametes are different from each other ✓ /variation (2)
(Mark first ONE only)

2.1.4 Prophase 1 ✓ (1)
(8)

2.2

- 2.2.1 (a) The synthesis of mRNA ✓ from a DNA template ✓ /by complementary matching of the nitrogenous bases in DNA (2)
 (b) The process of converting the information carried by mRNA ✓ to the correct sequence of amino acids ✓ to form a specific protein ✓ any (2)

2.2.2 UUA ✓ CGU ✓ UCA ✓ (in sequence) (3)

2.2.3 Methionine ✓ Tryptophan ✓ Valine ✓ (in sequence) (3)
(10)

2.3

2.3.1 Mouse 2 - X and Y/XY ✓
 Mouse 3 - X only/XX ✓ (2)

2.3.2 50% ✓ (1)

2.3.3 Mouse 2 ✓ (1)

2.3.4 A cross between mouse 3 and mouse 4 ✓ produced some offspring with white ✓ /recessive coat colour and white colour will only show up if both parents have at least one recessive gene ✓ / and 3 was dark therefore it must have been heterozygous any (2)
(6)

2.4

2.4.1 When two individuals with dominant contrasting characteristics ✓ are crossed, the F₁-generation all display heterozygous ✓ individuals in which both alleles ✓ are expressed ✓ equally any (3)

2.4.2 Each characteristic is regulated by two alleles ✓ /factors which separate ✓ during meiosis so that each gamete contains only one of the alleles ✓ /factors (3)

(6)**[30]**

QUESTION 3

3.1

- 3.1.1 A – prostate gland✓
 B – vas deferens / sperm duct✓
 E – urethra✓
 G – nucleus✓ (4)

- 3.1.2 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)

- 3.1.3 D✓ testis ✓/seminiferous tubules (2)

- 3.1.4 To keep the testes at a temperature that is (about 3 °C) lower than body temperature✓
 A lower temperature is necessary for the production and storage of healthy sperm✓/so that healthy sperms can survive (2)

- 3.1.5 (a) Interstitial cells✓/Cells of Leydig (1)

- (b) Testosterone✓ (1)

- 3.1.6 (a) Yes✓ (1)

- (b) 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)
(15)

3.2

- Determine a sample size that would be large enough and manageable ✓
- Keep the number of boys and girls the same✓for every age group
- Design a table to record the results✓
- Set up accurate measuring equipment✓
- Time span to be controlled✓/investigation to be completed in a short time
- Same nutritional status✓/same socio-economic conditions any (3)
(Mark first THREE only)

- 3.2.2 (a) 10 **OR** 13,4 – 13,6 years✓ (1)

- (b) Average height of boys and girls✓ of different age groups✓/
 between ten and eighteen years (2)

- (c) No✓ (1)

- (d) The girls are taller✓ than the boys at a younger age✓/
between 10 to 13 years

OR

The boys are shorter✓ than the girls at a younger age✓/
between 10 to 13 years

OR

The boys are not taller than the girls✓ at all age groups✓

(2)

(9)

3.3

- 3.3.1 As age of mother increases✓
chances of having a Down syndrome baby increases✓

(2)

- 3.3.2 During gamete formation✓/ Anaphase I/ meiosis I
the chromosome pair 21 does not separate ✓
Could also occur during meiosis II non-disjunction✓
failure of chromatids to separate ✓
one gamete will have an extra chromosome✓/24 chromosomes
If this gamete fuses with a normal gamete with 23 chromosomes✓
the resulting zygote will have 47 chromosomes✓

any (4)

(6)

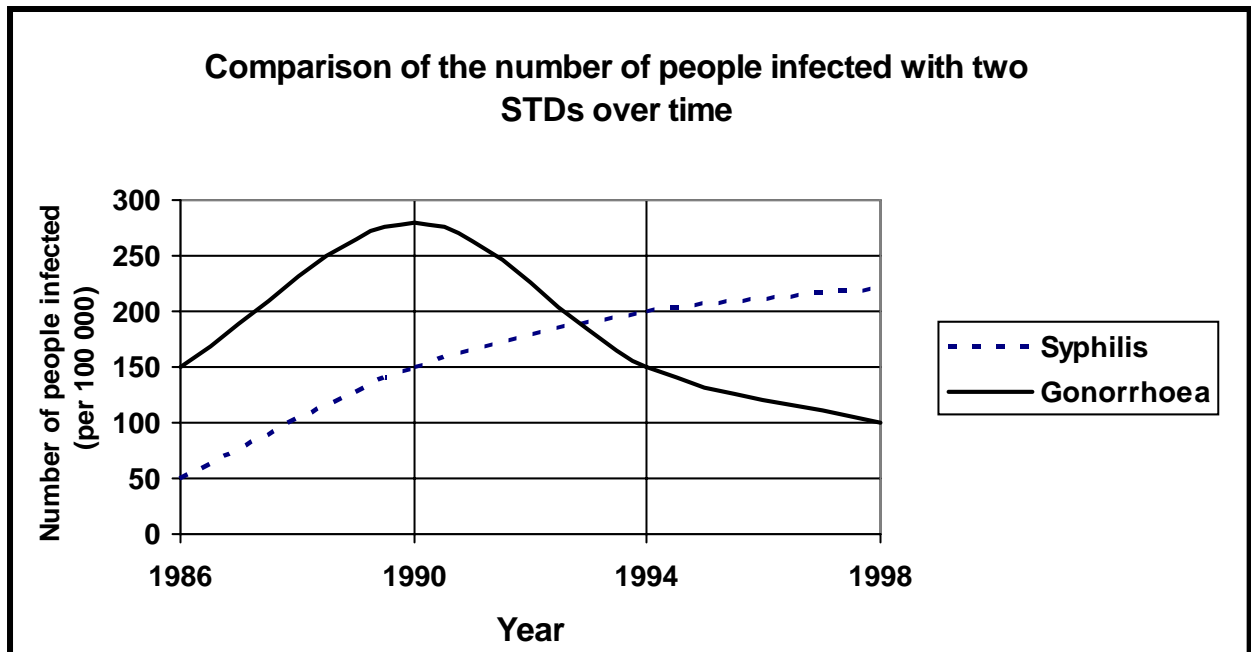
[30]

TOTAL SECTION B: 60

SECTION C**QUESTION 4**

4.1

4.1.1

**Rubric for the mark allocation of the graph**

Correct type of graph	1
Title of graph	1
Correct label for X-axis and Y-axis including unit	1
Graphs labelled/key provided for 2 graphs	1
All points joined for graph A & B	1
Appropriate scale for X-axis	1
Appropriate scale for Y-axis	1
Drawing of the graphs	1 – 1 to 2 points plotted correctly 2 – 3 to 5 points plotted correctly 3 – 6 to 7 points plotted correctly 4 – all 8 points plotted correctly

(11)

NOTE:

If the wrong type of graph is drawn:

- marks will be lost for "correct type of graph"
- marks will be lost for joining of points

If graphs are not drawn on the same system of axes

- mark the first graph only using the given criteria

If axes are transposed:

- marks will be lost for labelling of X - axis and Y- axis

4.1.2 Syphilis – the number of infections has increased✓ from 1986 to 1998
 Gonorrhoea – the number of infections has increased✓ from 1986 to 1990 and then decreased ✓ (3)

4.1.3 (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 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✓ (2)
(Mark first TWO only) (18)

4.2

4.2.1 Fertilisation✓ (1)

4.2.2 - man has low sperm count/ infertile✓
 - blocked Fallopian tubes✓
 - irregular menstrual cycles✓
 - imbalance of the hormones concerned with ovulation✓
 - sexually transmitted diseases✓ any (2)
(Mark first TWO only)

4.2.3 - Could be stored and used later✓ – if in vitro fertilisation fails the first time or if people want to have more children✓
 - Could be available to people✓ that cannot have children✓
 - Could be used to enhance research in embryology✓/genetic engineering to improve health/ensure survival of people✓
 - To produce human parts✓ to save lives✓ any 1 x 2 (2)
(Mark first ONE only)

- 4.2.4 IVF involves fusion of 2 haploid nuclei✓/gametes
whereas in cloning no fusion takes place✓/diploid nucleus
from a somatic cell is used.

OR

IVF can lead to variation✓ in the offspring
whereas cloning produces identical✓ offspring

OR

IVF 'mimics' natural sexual reproduction✓
whereas cloning no sexual reproduction✓/asexual
(**Mark first ONE only**)

(2)

(7)

4.3 Possible answers for the mini essay

Contraceptive methods and the effect on human reproduction

Method	Affect on human reproduction
Condom✓	Acts as a barrier✓/stops sperm getting into the vagina✓
Loop/IUD✓	It prevents fertilised eggs✓/embryos from becoming attached to the uterine wall✓
Femidom✓	Acts as a barrier✓ /stops sperm getting into the uterus✓/Fallopian tubes
Diaphragm✓	It covers the cervical opening✓ and prevents sperm from entering the uterus✓
Contraceptive pill✓	Contains artificially produced hormones✓ which prevents the production of eggs✓/ovulation
Spermicides✓	It contains a chemical substance that kills sperm✓ and acts as a barrier✓/prevents sperm from entering the Fallopian tubes.
Contraceptive injections✓	It contains progesterone✓/combination of oestrogen and progesterone which stops ovulation✓
Male sterilisation✓ - vasectomy	The sperm ducts are cut✓ and tied. Semen without sperm is produced✓
Female sterilisation✓ - tubal ligation	The fallopian tubes are cut✓ and tied during a small surgical operation preventing the fusion of sperm and egg✓
Withdrawal✓	The penis is removed✓ from the vagina before ejaculation✓
Rhythm✓	Sexual intercourse is avoided✓ during ovulation✓

(**Mark first THREE only**)

any 3 x 3 (9)

The influence on the quality of human life

Limits family size✓/unwanted pregnancies

- which allows better care for the children✓ higher standard of living✓/
less dependant on debt/ more psychologically stable children

Prevents the transfer of STDs✓

- the use of e.g. condoms can increase life span✓ and decrease✓ the spread
of diseases to other people

Might cause conflict✓

- e.g. the use of IUD could be seen by some people as a form of abortion✓
which may not be acceptable to some religions✓

Might promote promiscuity✓

- no danger of falling pregnant✓ and affects the morality✓

(Mark first ONE only)

any 1 x 3 (3)

Synthesis

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

(3)
(15)

TOTAL SECTION C: 40
GRAND TOTAL: 150