



eduresourceza.com



CONTROL TEST: May 2023

SUBJECT: Life Science

Grade 12

DNA and Protein Synthesis

EXAMINER:	J. J. Hanneman	MARKS:	60
MODERATOR:	C. van de Venter (Durban Girls College)	TIME:	60 minutes

MARKING GUIDELINES

QUESTION 1

1.1.

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

[5 MARKS]

1.1. Supply the correct term for each of the following definitions:

Term	Definition
RNA Polymerase ✓	Enzyme responsible for controlling the transfer of the code from DNA to RNA.
mRNA / messenger RNA ✓	Type of RNA that carries the genetic code from the DNA in the nucleus to the ribosomes of the cytoplasm.
Ribose ✓	Sugar molecule found in the nucleotide of an RNA base.
Purines ✓	Larger group of the nitrogen bases, composed of two rings.

[4 MARKS]

QUESTION 2

- 2.1 **Deoxyribose ✓ ("DNA" also acceptable)** (1)
- 2.2 **Double stranded molecule ✓
Hydrogen bonds between bases ✓** (2)
- 2.3 **E: Nucleotide ✓
X: Phosphate group ✓
Y: Sugar/deoxyribose group ✓** (3)
- 2.4 **Exact base pairing ensures accuracy ✓
Carrying genetic traits to future generations ✓** (2)

[8 MARKS]

QUESTION 3

- 3.1 **Red blood cells lack nuclei / have no DNA / do not carry genetic information ✓** (1)
- 3.2 **Ova are haploid / only containing one set of chromosomes (must describe the variation of DNA content) ✓
The gametes/sex cells are haploid to ensure a diploid zygote is created ✓** (2)
- 3.3 **Bar graph OR Histogram ✓ (Line graph not acceptable)
Graph must show the varying amounts for independent categories ✓** (2)
- 3.4 **Different types of cells ✓** (1)

[6 MARKS]

QUESTION 4

- 4.1 **Protein synthesis ✓** (1)
- 4.2 10: **Nuclear pore ✓**
 11: **Nuclear membrane/envelope ✓**
 13: **Nucleus ✓**
 14: **Ribosome ✓** (4)
- 4.3 **DNA/Deoxyribose nucleic acid ✓** (1)
- 4.4 **Double stranded ✓**
 Helix shape ✓ (2)
- 4.5 Name the processes that are occurring at: (2)
- 3: **Transcription ✓**
 15: **Translation ✓**
- 4.6 **Allows mRNA to move into the cytoplasm ✓✓** (2)

[12 MARKS]

QUESTION 5

- 5.1. **Six samples ✓**
 The victim's is taken so their DNA can be eliminated from the crime scene ✓
 The crime scene and suspects' DNA can be compared to find the criminal ✓ (3)
- 5.2. **Short tandem repeats ✓** (half mark awarded for abbreviation) (1)
- 5.3. **These sequences occur in all individuals ✓ and are highly variable ✓** (2)

5.4 **Suspect C ✓**
All 5 bands of the crime scene sample matches the DNA bands of suspect C
(2)

5.5 **Arguments for:**
- **High accuracy when done correctly**
- **Variation between individuals**
- **Can be used together with other evidence**

(Any two valid reasons) ✓✓

Arguments against:

- **Handling errors of samples**
- **Handling errors of interpretation**
- **Prone to corruption**
- **Planting of evidence**

(Any two valid reasons) ✓✓

(4)

[12 MARKS]

QUESTION 6

6.1 **1952 – 1874 ✓ = 78 years ✓** (2)

6.2 **The nature of science is tentative/always changing ✓** (1)

6.3 **Oswald Avery's findings supported Griffith's findings ✓✓**
Watson and Crick formulated their 3D model based on Franklin's image ✓✓
Watson and Crick formulated their model based on Chargaff's rules ✓✓

Any two answers (4)

6.4 **DNA and RNA are very small structures ✓ required the use of microscopy or imagery tools ✓ that weren't invented yet ✓**
(3)

6.5 **2000 – (400 C + 400 G) = 1200 remaining bases ✓**
1200 remaining = 600 A + 600 T ✓
600 A/2000 Total = 30% ✓ (3)

[13 MARKS]

TOTAL: 60 MARKS

eduresourceza.com