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Redhill School
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REDHILL HIGH SCHOOL
GRADE 12 DNA AND MEIOSIS TEST 2022
LIFE SCIENCES MARKING GUIDELINES

QUESTION 1-MULTIPLE CHOICE

Question	1.1	1.2	1.3	1.4	1.5	1.6
Answer	D	B	C	D	C	D

(6)

QUESTION 2

- 2.1 B
- 2.2 A
- 2.3 C
- 2.4 C
- 2.5 D

(5)

QUESTION 3

Analyse the diagram below illustrating a part of protein synthesis. Use the information provided as well as your own knowledge to answer the questions that follow.

- 3.1 Identify the letters of the following structures:

- 3.1.1 F
- 3.1.2 A
- 3.1.3 B

- 3.2 Arginine (2)

- 3.3.1 Tetracycline joins to the ribosome by the codons on the mRNA.

This prevents the tRNA from joining the mRNA and bringin in the amino acid
Therefore the protein will be truncated/cant be made.

Without proteins, the bacteria cannot function/survive resulting in the antibiotic killing the bacteria. (4)

- 3.3.2 Humans and bacteria have different ribosomes so the antibiotic that binds to the bacterial ribosome wont be able to bind to the human ribosome and therefore wont stop protein synthesis. (2)

QUESTION 4

4.1 Suspect 2

The DNA banding pattern/profile matches exactly indicating same length STRs (2)

4.2 To eliminate the victims DNA from the sample/ to ensure the evidence is not actually just the victims DNA. (1)

4.3

4.3.1 Hair, skin, blood, semen, cheek swab (1)

4.3.2 Advantage: can catch criminals easily and quickly/ identify victims from natural disaster or terror without having to find reference sample

Disadvantage: info could be used to exclude from medical aid or life cover/ your private info now public knowledge

(any good advantage and disadvantage. Must be clear which is which) (2)

4.3.3 Propose ONE advantage and ONE disadvantage to keeping a national database of DNA profiles. (2)

4.3.4 Yes / no – answer must not be emotive. (2)

QUESTION 5

5.1 Anaphase I – whole chromosomes are being pulled to the poles. (2)

5.2 Crossing over is occurring in prophase 1

Homologous pairs have lined up at the equator in metaphase 1

No centromere has split in anaphase !/ whole chromosomes are moving to the poles (ANY 2) (2)

5.3 Crossin over (1)

This results in the exchange of genetic material between maternal and paternal homologous chromosomes and leads to variation in the gametes. (2)

5.4 Heading: Biological drawing of cells undergoing metaphase II (1)

Centrioles and spindle fibres present (1)

Chromosomes arranged in a single row on the equator (1)

2 cells present (1)

2 chromosomes in each cell (1) – *if only one cell drawn but has the right number of chromosomes they get this mark*

One correct label (1)

(5)

QUESTION 6

- 6.1 A karyotype is a photograph of all the chromosomes in the nucleus in one cell (1)
arranged in homologous pairs/arranged from largest to smallest/ with the gonosomes
being the last pair (*any of the last points is the second mark*)
- 6.2 Klinefelters syndrome (1)
An extra X chromosome and also a Y. (2)
- 6.3
6.3.1 B
6.3.2 C
6.3.3 A
6.3.4 B (4)